FOOD MANUFACTURE

Incorporating Food Industries Weekly

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FOOD MANUFACTURE

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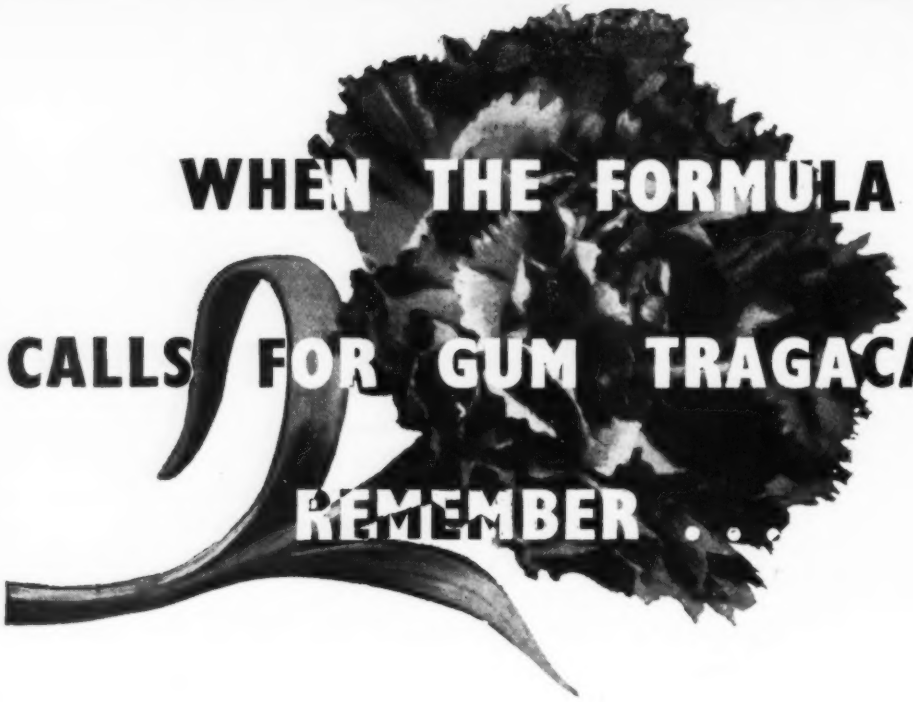

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FOOD MANUFACTURE

Vol. XXIV, No. 2 February 1, 1949

The Threat to Gold Coast Cocoa

THE grave position of the Gold Coast cocoa industry is stressed in the report of the Commission of three scientists, Dr. G. H. Berkeley of the Dominion Laboratory of Plant Pathology, Canada, Dr. W. Carter, head of the Department of Entomology, Pineapple Research Institute, Hawaii, and Professor E. van Slogteren of Holland, who were appointed to report on the measures necessary to eradicate swollen shoot, the virus disease of cacao trees.

About 50 million trees are affected and will have to be cut down. Thousands of acres have already been devastated.

According to the Commission: "The seriousness of the problem cannot be overestimated. The disease is rampant over thousands of acres in the Eastern Province, and is well established in Ashanti, where many plantings are just coming into production.

"In the Western Province there are at present only scattered outbreaks, but initial surveys are not yet complete.

"This is no minor foray, but a full-scale invasion which has already left some of the choicest cocoa-producing lands devastated and derelict. The defence must also be on a grand scale."

Other recommendations by the Commission include: (*a*) Research to find a quick chemical method of destroying trees to replace cutting. (*b*) Intensification of research in immunising trees by inoculating them with a mild form of disease. (*c*) As a long-term plan, crossing cacao with wild plants related to the tree to secure a resistant variety. (*d*) Importing parasites to kill mealybugs, which are responsible for the disease.

Bread Subsidy Cut

Bakers are very dissatisfied with the decision of the Ministry of Food to reduce the bread subsidy from 7s. 3d. to 7s. 1d. per sack and to discontinue the additional 1s. on each of the first fifty sacks a week. The reductions are retrospective to December 5, when the allocation period began.

It was only four months previously that the Ministry increased the subsidy, and the trade contends that costings show that during that period working expenses have continued to advance. The Ministry had intended to reduce the subsidy by 6d. a sack (making 6s. 9d.), but reduced the cut to 2d. "to take account of the increased cost of national insurance and a higher rate of profit on the small loaf." The official decision is also stated to have been based on costings, but these were the April figures.

Some bakers will lose 1s. 2d. on every sack they handle. Is the Ministry satisfied that these traders will still receive the notional profit of 5s. a sack? It is feared that, unless the Ministry reconsiders the position at an early date in the light of current operating costs, many small traders may be compelled to sell out to larger firms, while others may be compelled to reduce the degree of service they give to their customers, including the regular retail delivery of bread—a step that would be against the Government's aim of "full employment." Rural districts would be particularly affected, and some inconvenience to the public might be caused.

We are given to understand that discussions between the Ministry and the trade are proceeding at the time of this writing.

Nutrition Expert Honoured

Belated though it may be, we should like to express the gratification we felt on reading in the New Year's Honours List that a Barony had been conferred upon Sir John Boyd Orr. In this case a prophet has not been "without honour in his own country, and among his own kin, and in his own house."

Boyd Orr's greatness as a scientist and leader has been recognised not only during his lifetime but while he is still active; for though figures insist that he is in the late sixties and facts say that he has retired from the Director-Generalship of FAO, he shows no signs of resignation or retreat from the battle-front of nutrition. There he has stood for at least twenty years, often embarrassing the complacent and the orthodox, insisting and insisting upon adequate standards of nutrition for all; not merely for all in one for-

tunate country but in all countries and for all races.

England can claim very little credit for Boyd Orr. Ayrshire bred him, Glasgow University trained him (first as a graduate in Divinity and only second, when he had changed his mind, as a doctor of medicine), and Aberdeen University gave him a research laboratory. It has been said that it was the slums of Glasgow that gave him his fiery abhorrence of malnutrition. The uniqueness of John Boyd Orr lies in the time-table of his career; the abandonment of the idea of becoming a preacher in favour of becoming a doctor; then the abandonment of practising as a G.P. in favour of research on nutrition and malnutrition. Years of research followed during which personal investigations were accompanied with the building-up of the Rowett Research Institute. This period culminated in his election as a Fellow of the Royal Society in 1932. After this the more public part of his career, the appeal to the world's conscience, the condemnation of malnutrition's existence at a time when most of us were believing that food surpluses were an inevitable modern problem. The man who had done a good deal of the research was determined to see that it was put into action. The man who had produced the facts became his own statesman for the purpose of putting them across. He became a Member of Parliament—again thanks to the Scotland whose Universities put him there. And finally, as all the world knows, he became the first Director-General of FAO. If he failed to secure all that he wanted for FAO, he achieved far more than anyone else expected. Let us hope he will have many more years of vigour to continue his battle for good food for all from his new platform, the House of Lords.

Ice Cream as "Reagent" for Vanilla

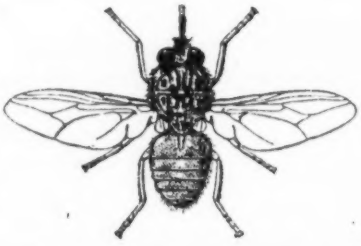
A method of testing vanilla by means of ice cream is described by Gilda C. Vicente and Merriam A. Jones in the annual report of the Federal Experiment Station in Puerto Rico. Existing tests, phenol value, lead number, and resin content are not effective in themselves. Even the usual grader's examination for texture, colour, aroma, and appearance is not entirely satisfactory, although all these criteria have some value when taken together, but when differences of quality among samples are small, they do not satisfactorily differentiate them.

The authors have found that the use of ice cream consisting of one pint of cream (40 per cent. butterfat), four pints of milk (4 per cent. butterfat), 373 g. of sugar, and 7·5 g. of gum tragacanth to which samples of vanilla are added gives satisfactory results. The mix was divided into separate portions for each sample and the vanilla extract added at the rate of 21 ml. per 100 ml. of mix. The ice cream samples were tested from three to twenty-two hours after freezing in two series with coded designations.

The report details the method of testing and gives an interpretation of scores made by six testers.

Tsetse Fly

There is a danger that the wide publicity that has been given to the discovery of the new drug Antrycide will give an erroneous impression, especially to the layman. Any promise that the meat shortage in Britain may be alleviated in the near future by imports of an appreciable quantity of beef from Africa would be unduly optimistic.



The discovery made by the small group of I.C.I. chemists and its subsequent experimental application in the field can only be fully appreciated by those conversant with the extreme complexity of the work, and when Mr. Rees Williams, Parliamentary Secretary for the Colonies, spoke of the possibility of promoting big-scale cattle ranching in Africa, enabling her to carry much more cattle than Argentina, he was doubtless alluding to the long-term aspect of the matter. Every scientist knows that the transference of a laboratory discovery to a large-scale practical application is one beset with many, and sometimes unforeseen, difficulties in the factory. But when such an application involves work in an intractable country like Africa, the collaboration of native owners of cattle, and a dozen other complications, it must be admitted that considerable time must elapse before results can be expected. However, those concerned mean business. The drug is going into mass production; sufficient of it for 2 million animals should be available this year. Antrycide is to be the main item on the agenda of the Veterinary Conference of the African Empire nations to be held in London this month.

The New Factories Act

A number of food manufacturers appear to be unaware of the obligations placed on them by the Factories Act of 1948, which came into force on October 1 last.

Any food manufacturer who proposes to use any premises as a factory for the first time, no matter whether the premises be old or new, must notify the Ministry of Labour District Inspector of Factories at least one month in advance. Hitherto it had been in order to notify the inspector one month *after* a factory had been opened.

Notice must also be given under the new regulations by any food manufacturer who proposes to use a shop, or any part of it, for the purposes of a factory within the meaning of the Act.

Every notice must state the type of work to be done, whether mechanical power is to be used (except for heating, lighting or ventilating), and, if so, the type of power. A month's notice must also be given before mechanical power is first used in a factory.

New Source of Nutrition

For upwards of 130 years scientists have been conducting experiments with chlorophyll, and as a result it would naturally be expected that this would have become a substance of major importance in that its specific properties, without which life would not be possible on this planet, could be utilised by mankind. According to Drs. Sophia and Boris Berkman the chlorophyll produced today by the use of organic and inorganic reagents is only the pigment component of the physiological chlorophyll of the plant cell. Even the molecule of this extracted pigment component is changed with respect to its original chemical structure as a result of the present extraction methods.

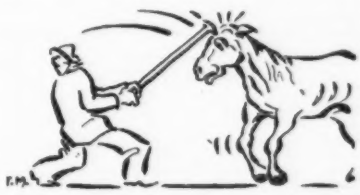
In a paper presented at the 1948 National Farm Chemurgic Conference, the authors announce that they have been able to develop a method for the production of biologically active, unaltered, stable chlorophyll, which they have taken to the pilot plant stage. These physiologically active entities, or chlorophyll units, act in the same way as vitamins and hormones; they contain pro-vitamins A, E, and K, thus representing a new and inexpensive source of production of these vitamins.

The method is based on disintegration of the plant cell into its component parts. By separating the proteins of the cell from the cellulose lining, which is indigestible by the intestinal tract of man, the proteins of grass, alfalfa, etc., are made available as a new source of nutrition.

That these preparations are non-toxic has been proved at North-western University, where intravenous injections as high as 12·9 per cent. concentration of the chlorophyll were given to dogs over a period of months without any toxic effect whatsoever. Clinical results indicated that physiological chlorophyll acts as a catalyst in the human system and has effect on the metabolism, and some pathological conditions, such as high blood pressure. Since pathological changes are due to the slowing down of the rate of oxidation in the cell, administrations of chlorophyll, in the opinion of the authors, might well be the means of prolonging life.

Knock for Knackers

In the House of Commons recently the Knacker's Yard Order, 1948, was discussed. This Order requires the occupier of a knacker's yard to be licensed by the Minister of Food as well as by the local authority under existing law. It was superimposed on existing law which provided for control by the local authority with ultimate appeal to the courts. The Order provided no such safeguard, and made the Minister a complete autocrat. Sir John Mellor moved that this Order be annulled. Dr. Edith Summerskill, in reply, said that an enquiry by Sir John Bodinnar had shown that knackers' yards had increased from 200 to 400. Meat was going into them and was being sold at more than the controlled prices, and was also being disposed of illegally for human consumption. That was why it was essential that the Ministry should exercise control. Here was a new enterprise which was being regarded by many unscrupulous men as a means of gain, and that was why the Government decided to exercise their powers under Regulation 55.



Before the war knackers' yards were looked upon as places where aged horses were destroyed, the meat being generally used for pets. Now the yards were used as a source of food for human consumption. Her Department (Dr. Summerskill concluded), as guardians of the people's food, should say to those unscrupulous men—those black-hearted black marketeers who are prepared to make profits—that the time had come to insist on records being kept.

Danger in Jam Tarts

Described recently by the chairman of magistrates at Sheffield as in the nature of test cases, two Sheffield confectioners were fined for selling jam tarts made with mineral oil in place of vegetable or animal fats. One of the confectioners had used purified paraffin, which formed one-third of the shortening in his tarts, and the other had used petroleum jelly to the extent of 96 per cent.

The Public Analyst said that medical evidence showed that if mineral oil were absorbed into the body it might remain for all time as an irritant and might be one of the causes of cancer.

For exposing people to these risks the two confectioners were fined a total of £5!

The chairman said that he had been informed that tarts of this composition were being sold widely in a great many shops, and that mineral oil was being sold in petroleum jelly form and used by housewives in the making of pastry. In the circumstances he did not propose to impose a heavy penalty.

Know your Neighbour

Members of "tasting panels" in the food industry will be interested in an experiment quoted by Mr. Roger J. Williams in addressing the Centennial Meeting of the American Association for the Advancement of Science. A chemical was tasted by 6,377 persons in a special study; of those who tasted it, 21·3 per cent. found it tasteless, 64·5 per cent. found it bitter, 5·4 per cent. found it sour, 2·1 per cent. found it sweet, 4·8 per cent. found it salty, and the remaining 1·9 per cent. ascribed to it miscellaneous other tastes.

Physical sciences and their applications will continue to thrive, but the most significant development of the next century, Mr. Williams believes, will be in the realm of human science or of understanding people. Social problems can only be solved if we understand what people are like. They should be studied anatomically, physiologically, psychologically, and in their social relations. Differentiation or individuality is a potent factor in every social problem. One of the crucial tests in understanding people is to know how they are alike and how they differ from one another. Inequalities are the very basis of our democracy; people differ from one another because of their inheritance and because of the differences in environmental influences, although the relative importance of the two factors is still a matter of opinion. Individuality in shape, size, and cellular composition is just as pronounced with respect to people's thyroids, adrenals, sex glands, and pituitary glands as in the shape and size of their bodies. It is therefore not surprising that we do not see eye to eye and that our other senses do not work uniformly for all of us.

The main burden of Mr. Williams' address is that there is still much to be done in the study of these matters. The experiment that Mr. Williams cites is sufficient to demonstrate the complexity of the problem.

Pounds and Pints

The perennial subject of old British measures retained in face of demands for the metric system has again been brought up for an airing. A committee appointed to review legislation on weights and measures began operations by having a look at the "Imperial" standard yard and the "Imperial" standard pound — still called such, though someone will be suggesting "Commonwealth" before long. The pound, still weighing 16 ounces, was safely guarded there—a chunk of platinum covered with a glass tumbler and solemnly looked upon before being wrapped away in special paper, enclosed in a silver-gilt thimble, encased in a gunmetal case, and the whole locked up in the strong room safe. In face of which, how dare those metric enthusiasts with their "damned dots" suggest we should buy our flour, cheese, and butter by the kilogramme rather than the true-British pound, or our beer and milk by litre rather than pint?

The most effective reply to metric devotees was made when the Red Lions, unofficial club of British Association members, met long ago in taverns to dine off "beef cooked in various fashions and moistened with sundry potations of beer." Following invitation cards announcing "the Carnivora will feed" and that "Bones will be provided at the Menagerie at 5.45 p.m.," the Lions would vigorously shake their coat tails, growl and roar under the leadership of Professor Forbes, and burst into such songs as:

Some talk of millimetres, and some of kilogrammes,
And some of decilitres to measure beer and drams;
But I'm a British Workman, too old to go to school,
So by pounds I'll eat, and by quarts I'll drink,
And I'll work by my three-foot rule.

Mixing of the ingredients is entirely a hand operation.

How Haggis is Made

Although haggis is a relatively little-known food outside Scotland, it has increased in popularity during the war years. Demand to-day is greatly in excess of supply since the product is not one that lends itself readily to substitute ingredients. The shortage of liver and fat has been a particularly serious blow to manufacturers, and production has had to be limited to the availability of raw materials.

NO large-scale plant is used in the manufacture of haggis and, although certain stages of production have been mechanised, this has not been done to any great extent. For the most part, production is in the hands of the larger manufacturing butchers in various Scottish centres, the manufacture of haggis being an incidental activity to the marketing of meat and meat products.

Haggis is mainly a mixture of meats and cereals cooked in a skin. Historically, it derives from the necessity in the past of making use of native products, and of utilising in an appetising fashion the bits and pieces from which an attractive dish could not otherwise be made.

Basic Ingredients

Although the basic ingredients used today are similar to those used before the war, and consist of sheep's liver, cereals, fats (dripping or lard), oatmeal, with such seasoning or additions as the maker considers necessary, shortages of liver and fat make it impossible to duplicate pre-1939 recipes. Similarly the shortage of the maw or stomach bag of the sheep, in which haggis is traditionally contained, has necessitated the use of ox intestines.

Notwithstanding all these difficulties, the manufacture of haggis is passing through a boom period,

The mix is fed under pressure into a prepared bag.

After packing, the bags are subdivided into smaller sections, tied, and prepared for boiling.

although the haggis served as a restaurant dish is only a shadow of the article formerly dished up at a Burns' Supper, and manufacturers will welcome the chance to return to quality production.

The manufacturing process is a simple one, carried out almost entirely by hand. The ingredients, including the ready-cooked liver, are passed to the assembly tables and weighed. The liver is chopped by hand and, together with the rest of the ingredients, transferred to a machine mixer of the type used in the baking industry. As in the manufacture of oatcakes, the consistency of the mix is largely a matter of skilled assessment by the worker concerned. On completion of this process, the mix is then weighed into lots and handsewn into a bag in a roughly circular shape.

After final cooking and cutting into single units, the steaming haggis is left to cool.

Preparation for the Table

After cooking, which is carried out in an ordinary boiler using gas, coal, or electricity, the haggis is lifted out by a metal ladle and cooled. During cooking, the product swells, the resultant taut, rounded bag being easily handled for packing. Preparation for the table involves merely the reheating of the haggis in boiling water. It is served in its skin, the server cutting the sewing, and spooning the mixture on to the plates.

After boiling, the strung haggis is netted out and loaded on to a trolley for cooling, cutting, and packing.

As in the case of oatcakes, the fat content of the haggis makes it a semi-perishable product and one where the bulk of production is limited to regularity of clearance, the shelf life of a partly cooked haggis varying from seven days to as low as two days depending on atmospheric temperature.

A Celebration Dish

While manufactured chiefly in smaller sizes ranging from ¾ lb. to 2½ lb., haggis weighing 12 lb. and 13 lb. is produced for special events, the most im-

portant of which are St. Andrew's Day and Burns' Night. These events in November and January are traditionally associated with haggis, and manufacturers normally work well ahead to meet the demand, by getting extra staff and by working late the week before. After cooking the haggis is put into cold store, but this method is not liked by manufacturers, who prefer the haggis to be used as soon as possible after cooking.

For export, haggis is packed in tins as a sterilised product. Although a considerable export trade is done, the product is not generally in demand all the year round. During 1948 a haggis was delayed at New York by the Port Authorities who found no suitable classification under which to admit the product to the United States. It was not until the British Ambassador intervened to supplement the pleas of haggis-hungry Scots awaiting their Burns' Night supper that the haggis was released and sent to its destination.

Manufacturers are much more concerned with the day-to-day market for the product, and have watched with interest its widespread acceptance over the war years. They are reluctant to claim that this added demand means a genuine increase in sales, however, since present food shortages disguise the extent of true demand.

It has been suggested, however, that the experimental combination of meats and seasoning in this product would make it more acceptable to a wider variety of tastes and would do much to increase its appeal.

Food Research

A SUMMARY of the work done during the years 1940 to 1945 and a more detailed report for 1946 are included in the first report* of the Food Investigation Board published since 1938. During the war-time period the resources of the Food Investigation organisation were devoted almost entirely to problems connected with the emergency. The main effort in research was directed to the development of various dehydrated foodstuffs, but, in addition, the organisation provided an important reservoir of accumulated scientific knowledge and of experienced personnel which was drawn upon freely in connexion with numerous and varied war-time problems relating to food.

However, in the early stages of the 1940 to 1945 period, it was possible to continue with a small amount of research of a more general character. For example, an important contribution in the field of the biochemistry of carbohydrates was the discovery of the reversible formation of starch from glucose-l-phosphate. Other work included investigations on improved methods of storing carrots, and on the saving in refrigerated space which could be achieved by shipping boneless meat.

After the prolonged concentration upon emergency problems during the war-time period, progress was made in 1946 towards the resumption of a more balanced and diversified programme of research which included a fair proportion of longer range and more fundamental studies. This year also saw the opening of the two "market" laboratories at Smithfield and Covent Garden.

Meat, milk and eggs, fruit, vegetables, and physics and engineering were the subjects of investigation at the Low Temperature Research Station and the Smithfield Laboratory. A broad attack on the problem of the quality of meat was initiated, embracing various lines of research bearing upon such particular aspects as the composition of carcasses, the structural elements of meat, the substances responsible for its flavour, and the chemical transformations which occur during its cooking. Investigations were also resumed in the study of whale meat, for which purpose a small scientific expedition was sent to the Antarctic.

Investigations were undertaken in collaboration with the Hannah Dairy Research Institute on methods of improving the keeping properties of whole milk powder, and, arising from earlier work, a continuous process for treating egg pulp was developed which yielded dried egg powders with greatly improved keeping properties under warm conditions of storage as compared with the untreated control products.

The programme of fundamental research on the metabolism of fruit was resumed, and investigations into potato problems in general were carried out in close association with the Ditton Laboratory. A comprehensive survey was made of the literature relating to the corrosion of aluminium and aluminium alloys with special reference to the use of these metals in the food industry.

Work at the Ditton and Covent Garden Laboraties has been carried out on both practical and theoretical aspects of such subjects as dips, or skin coatings, as a means of improved fruit storage, the volatile compounds produced by apples in storage, which were studied in relation to apple "scald," the cold storage of plums, and the ripening of late season tomatoes; an investigation on the storage of potatoes in bulk has also been made.

At the Torry Research Station investigations in the main were devoted to the freezing of fish and storage of the frozen product, smoke-curing of fish, salt-curing of herrings, the utilisation of fish in dried forms, a survey of the field of fishery by-products, and bacteriology in relation to fish problems.

Four appendixes conclude the report, these giving details of members of the Board for the period under review, scientific missions, Food Investigation staff, and reports and papers published or submitted for publication during that period.

* *Food Investigation, 1940-1946*. Published for the Department of Scientific and Industrial Research by H.M.S.O. Pp. 41+ii. Price 9d.

Ministry of Food

Latest Statutory Instruments

The list given below is the continuation of the list of Orders published in *Food Manufacture*, Jan. 1, 1949, page 14.

No.	*Date.* 1948.	PRICE FIXATION ORDERS
2534	Dec. 5.	Order amending the Raw Cocoa (Control and Maximum Prices) Order, 1946. Revokes S.R. & O. 1947, Nos. 552, 2817.
2535	Nov. 28.	Order amending the Poultry (Control and Maximum Prices) Order, 1947.
2536	„ 28.	Order amending the Poultry (Control and Maximum Prices) (Northern Ireland) Order, 1947.
2537	„ 28.	Order amending the Rabbits and Hares (Control and Maximum Prices) Order, 1944.
2610	Dec. 4.	The Fish (Maximum Prices) Order, 1948. Revokes S.R. & O. 1947, Nos. 1989, 2755; S.I. 1948, Nos. 78, 1508.
2634	„ 5.	Order amending the Cheese (Control and Maximum Prices) Order, 1948.
	1949.	
2707	Jan. 16.	Order amending the Meat Products and Canned Meat (Control and Maximum Prices) Order, 1948.
		FEEDINGSTUFFS
2686	Jan. 1.	Order amending the Feedingstuffs (Rationing) Order, 1943.
		FISH
	1948.	
2611	Dec. 4.	The Fish Sales (Charges) Order, 1948. Revokes S.R. & O. 1947, No. 2024.
		FRUIT
2533	Nov. 26.	Order amending the Imported Deciduous Fruit Order, 1947.
		LICENSING
2584	Nov. 28.	Order amending the Food (Licensing of Establishments) Order, 1948.
2585	„ 28.	Order amending the Food (Licensing of Retailers) Order, 1948.
		MANAGEMENT OF BUSINESSES
2612.	Dec. 3.	The Food (Management of Businesses) Order, 1948.
		PIGS
2765	Dec. 23.	Order amending the Pigs (Sales) Order, 1948.
		POINTS RATIONING
2635	Dec. 5.	Order amending the Food (Points Rationing) Order, 1948.
		POTATOES
2673	Dec. 15.	Order amending the Ware Potatoes (1948 Crop) (No. 2) Order, 1948.
		RATIONING
2498	Nov. 21.	The Food Rationing (General Provisions) Order, 1948 (General Licence No. 2) Order, 1948.
2509	Dec. 5.	Order amending the Rationing (Personal Points) Order, 1948.
		SOAP
1638	July 18.	The Soap (Licensing of Manufacturers and Rationing) Order, 1948.
		VEGETABLES
1884	Aug. 15.	Order amending the Canned Fruit and Vegetables (No. 2) Order, 1946.
2230	Oct. 6.	The Onions and Green Onions (Revocation) Order, 1948. Revokes S.R. & O. 1945, No. 1669; 1947, Nos. 1890 and 1928; S.I. 1948, No. 911.
2363	Nov. 1.	The Carrots (1948 Crop) (No. 2) Order, 1948. Revokes S.I. 1948, No. 1215.

Multum in Parvo

ANYONE engaged in a particular industry will welcome a book on his subject if he knows that it is written by a practical man with years of experience behind him. Such a book* by Mr. A. E. Miller, M.Inst.R., M.S.E., on refrigeration has just been published. Developed from notes collected over a long period, this pocket-sized book is crammed full of practical information in the form of text, diagrams, and tables. Its contents are not too academic to appeal to the operator, not too technical for the administrator, and not too elementary for the engineer, research worker, or scientist.

As the author states, one of his difficulties has been to combine the old with the new. There are many installations where old-fashioned plant is still in use and likely to be operating for some years to come. For example, atmospheric condensers, horizontal, slow-moving compressors, and charcoal insulation are still quite common. Unit evaporators, high-speed compressors, and flooded feeding are, of course, more up to date. The notebook had, of necessity, to be informative on both old and new plants, both of which have been adequately dealt with.

Such subjects as quick freezing, ice cream, and dairy products are covered with a surprising clarity, considering the necessity for a maximum economy of words. The size and shape of the book make it handy for reference, useful as an easy guide, and an immediate help in the field and on the job.

This little notebook bears the stamp of the practical standpoint of a man who not only knows his job, but knows exactly what the other man needs to look up in his daily work.

* *Refrigeration Note Book*. By A. E. Miller, M.Inst.R., M.S.E. Pp. 328+xl. London. Price 10s.

Standards for Vinegar

THOMAS McLACHLAN, F.R.I.C., A.C.G.F.C.

What is vinegar and how should it be described? These are questions which for some years have exercised the minds of experts in many countries. In this article the author discusses standards and labelling provisions which might clarify the position not only in Great Britain but in other countries.

MANY of the problems of mankind arise from a desire to include different things and people under generic titles, and many of this country's troubles have arisen from the desires of governments throughout the centuries to obtain taxes for the running of the country. For many years every vinegar maker had to hold a licence, and, so far as is known, the words "vinegar" and "acetous acid" have always been bracketed together in Acts of Parliament since 1818, except in the Spirits Act, 1880, where it is stipulated that a distiller may not carry on upon his premises the business of a maker of vinegar.

History of Vinegar

In 1817 the definition of a vinegar maker was held to include a blacking manufacturer, because vinegar was used in the manufacture of blacking. In 1822, in the case of Attorney General *v.* Houlgrave, a tar distiller was held to be a vinegar maker because he produced acetous acid as a by-product, and in 1855 duty was even claimed on paper manufacture.

Searching history still further, consideration may be given to the meaning of the words "vinegar" and "acetic acid." The Latin word for vinegar was *acetum*, and this word is brought forward in most pharmacopoeias and in the Vulgate text of the Bible. The word "vinegar," on the other hand, is much more modern and is derived from *vin aigre* or sour wine. The use of the word "vinegar" for acetous liquids other than sour wine may therefore be likened to the introduction of the words "mutton" and "beef" into this country with the Norman conquest.

Early Legislation

The first test action to decide whether artificial vinegar should be called vinegar or not was heard at Birmingham Quarter Sessions on Monday, July 3, 1893, and the Recorder decided that artificial vinegar should not be called vinegar. A decision of Quarter Sessions is, however, not a decision of the High Court and is only binding within the area of the Sessions. Many other actions were fought at about the same time and were vigorously defended by manufacturers of artificial vinegars, with the result that Local Authorities became nervous of the expense of these actions and let the matter rest.

In 1908 the Local Government Board issued Report No. 5 "On the preparation and sale of vinegar, in relation to the administration of the Sale of Food and Drugs Acts." Among the recommendations made at the end of the report was the suggestion that the sale of artificial vinegar as vinegar without any qualification was not in the public interests, and that some word, if the term "vinegar" were retained, should be added to make the nature of the product apparent. This was followed, in 1911, by a letter from the Assistant Secretary of the Local Government Board to the Secretary of the London and Country Vinegar Brewers' Association, Ltd., setting forth definitions which it was felt might properly be adopted.

This letter has been mentioned in numerous cases before the Courts, and it has been held that this is merely an expression of opinion, but the Government has never made any serious attempt to control the position, although the Inter-Departmental Committee on Food Standards has issued a report on vinegar, which, again, has no force in law and which requires amplification.

Definitions for Vinegar

In 1937, by arrangement, the City of Westminster fought a test case at Bow Street and an Appeal was taken to London Sessions, as a result of which it was decided that table vinegar should be a brewed vinegar. No appeal against this judgment was lodged, and it has usually been accepted as settling the matter that only a brewed vinegar may be called "vinegar."

There has, however, been no serious attempt in this country to lay down definitions for "vinegar," "spirit vinegar," or "artificial vinegar," though other countries have been more forward in the matter, and the earliest in the possession of the author are those of the Government of New South Wales, dated May 11, 1910. In the author's opinion these are still about the most satisfactory definitions of vinegars to be found anywhere. Vinegar means any fermented product, obtained by alcoholic and acetous fermentation, while acetic acid mixtures are to be described as "vinegar substitutes." Most types of vinegar are mentioned, such as malt vinegar, wine vinegar, apple or cider

vinegar, fruit vinegar, sugar vinegar, malt and sugar vinegar, honey vinegar, glucose vinegar, spirit or alcohol vinegar, malt and alcohol, or malt and spirit vinegar. Any vinegar or vinegar substitute must contain 4 per cent. of acetic acid.

In most countries the use of the word "vinegar" without qualification is restricted to a fermented product, but in this country, in the United States, and in France, the term "vinegar" without qualification refers to three different products: malt vinegar in the first country, cider vinegar in the second, and wine vinegar in the third. Distilled vinegar in this country is usually thought to be vinegar distilled from malt vinegar, but in the United States it is a legal name for spirit vinegar, and in Soho, London, it means distilled wine vinegar and is usually called Orleans vinegar.

Types of Vinegar

In the hope of clarifying the position slightly it was thought desirable to place on record definitions which might prove suitable as a basis for standards not only in this country, but in practically every country in the world, even though no mention has been made of date or other types of vinegar which could be included when necessary. These are as follows:

(*a*) Vinegar may be of the following kinds:

(i) Malt vinegar shall be the product of alcoholic and subsequent acetous fermentation of a malt infusion or a sugary infusion obtained by the saccharification of starch by the diastatic enzymes of malt.

(ii) Wine vinegar shall be the product obtained by the alcoholic fermentation of grape juice and its subsequent acetous fermentation, with or without dilution with water.

(iii) Cider vinegar shall be the product of the alcoholic and subsequent acetous fermentation of apple juice.

(iv) Sugar vinegar shall be the product obtained by the alcoholic and subsequent acetous fermentation of sugar syrup, molasses, or refiner's syrup.

(v) Glucose vinegar shall be the product obtained by the alcoholic and subsequent acetous fermentation of a sugar solution obtained from cereal starches, which have been saccharified other than by the use of malt.

(vi) Spiced and flavoured vinegars shall be vinegar to which spices or fruit juices have been added, or they may be sugary solutions containing spices or fruit juices, which have undergone subsequent alcoholic and acetous fermentation.

(vii) Pickling vinegar shall mean vinegar of a strength suitable for pickling purposes.

(*b*) Distilled vinegar shall be the product obtained by the distillation of vinegar.

(*c*) Spirit vinegar shall be the product obtained by the acetous fermentation of dilute alcohol to which small amounts of yeast food shall have been added.

(*d*) Artificial vinegar products shall be of the following kinds:

(i) Artificial vinegar or non-brewed vinegar shall be the product obtained by the dilution of acetic acid with water and/or flavouring materials and colour.

(ii) Artificial or non-brewed pickling vinegar shall be artificial vinegar of a strength suitable for pickling purposes.

(iii) Concentrated artificial vinegar or concentrated non-brewed vinegar shall be a strong solution of acetic acid in water with or without added flavouring and colouring matter.

(iv) Spiced or flavoured vinegars (non-brewed) shall be artificial vinegar to which natural spices, fruit juices, or natural essential oils have been added.

Suggested Standards

The following standards are suggested for vinegar and vinegar substitutes:

1. The use of the word "vinegar" without any qualification shall be restricted to products which have undergone an alcoholic and subsequent acetous fermentation without any intermediate or subsequent distillation.

2. All vinegars, distilled vinegars, and spirit vinegars shall contain not less than 4 per cent. weight in volume of acetic acid.

3. Pickling vinegar shall contain not less than 6 per cent. weight in volume of acetic acid.

4. Artificial vinegar shall contain not less than 4 per cent. nor more than 7 per cent. weight in volume of acetic acid.

5. Pickling spirit vinegar or pickling artificial vinegar shall contain not less than 5 per cent. weight in volume of acetic acid.

6. Concentrated artificial vinegar shall contain not less than 50 per cent. nor more than 60 per cent. weight in volume of acetic acid.

7. Vinegars shall not be coloured other than by the addition of caramel. Distilled vinegar and spirit vinegar shall not have any colouring matter added to them. Artificial vinegar may be coloured by the addition of caramel.

8. Spirit vinegar shall contain such traces of alcohol, esters, and other products of fermentation that when calculated to a basis of 4 per cent. of acetic acid, it shall show an alkaline oxidation value of not less than 10, an acid oxidation value of not less than 400, an ester value of not less than 10, and an iodine value of not less than 10. It shall be illegal to add flavours or chemicals to artificial vinegar in such amounts that the resulting product gives figures indicating that the vinegar is spirit vinegar.

Labelling Provisions

The following labelling provisions for vinegar and vinegar substitutes are suggested:

1. All vinegars obtained by a direct double fermentation process may be described as vinegar with or without an appropriate descriptive adjective.

2. Distilled vinegar, spirit vinegar, artificial vinegar, or concentrated artificial vinegar shall be described as distilled vinegar with or without an adjective descriptive of the source from which it is distilled, spirit vinegar, artificial, or non-brewed

vinegar, or concentrated artificial vinegar as appropriate.

3. Concentrated artificial vinegar shall be labelled with the words "Contains . . . per cent. of concentrated acetic acid and must not be used without dilution. This essence should be diluted with not less than 12 parts of water for consumption."

4. Spiced and fruit vinegars may be described with an adjective appropriate to the spice or fruit, which shall have been added to impart a particular flavour. Artificial vinegars flavoured with spices or fruit juices shall be described as ". . . Vinegar, Non-brewed."

5. The presence of any salt, which may have been added to a vinegar to assist the keeping properties, shall be declared on the label. In the event of the amount of salt being less than 1 per cent., the amount of salt may be described as "This vinegar contains a small amount of added salt," but when the amount of salt is more than 1 per cent. it shall be described as "With added salt."

Meat Survey

WORLD exports of beef and pig meat in 1947 were respectively about 15 per cent. and 50 per cent. below pre-war levels, according to a report* issued by the Commonwealth Economic Committee; the quantity of mutton and lamb in world trade, on the other hand, rose by 30 per cent., and of canned meat by more than 70 per cent. over the period. The Commonwealth share of world exports has risen for beef, bacon, and canned meat, but for mutton and lamb it has fallen. Commonwealth countries supplied one-half of the United Kingdom's reduced imports of all meat in 1947, compared with about two-fifths before the war.

Beef Production

In both Australia and New Zealand beef output during the war years was to some extent limited by the need to expand dairy production, but in Canada plentiful feed supplies enabled production to be increased heavily, while in the United States the increase was on a far larger scale. This movement, however, was not paralleled in the South American producing countries. Output in Europe generally declined considerably during the war, and has not yet recovered to pre-war levels. For the world as a whole, production appears to have increased in 1945-1946, particularly in the Commonwealth, but there were some recessions in 1947.

Mutton and Lamb

Australian production of mutton and lamb has declined from the high war-time levels to rather less than pre-war, but New Zealand has shown a marked increase; killings in the United Kingdom have been well below pre-war levels. Slaughterings in the United States, still the world's largest producer of mutton and lamb, although not a large exporter, rose till 1943 but have since declined. On the other hand, production in Argentina has almost doubled since before the war.

Trends in Pig Meat Production

Production of pig meat in the United States—already by far the greatest in the world—had nearly doubled by 1943-1944: in Canada and Argentina, production, although on a smaller scale, underwent a greater proportionate increase. In Australia the expansion was neither so large nor so continuous, while in New Zealand there was some diminution after the peak of 1941. Reductions in both the United Kingdom and Eire were large, and in Continental European countries severe. In general, during the period 1945-1947, there tended to be a reversal of war-time trends, with some falling off from the high levels reached on the American Continent and some recovery from the low levels to which production had fallen in Europe; in the United Kingdom, however, the post-war period was marked by a further decline.

Meat Consumption

The high level of *per caput* consumption of meat in producing countries has tended to be maintained in the past decade. In some it has been increased, notably in the United States from 128 lb. a year before the war to 155 lb. in 1947, and in Canada from 111 lb. to 135 lb.; but there were reductions in Australia from 239 lb. to 187 lb., and New Zealand from 226 lb. to 194 lb. by 1946. On the other hand, the consumption of meat in the United Kingdom was reduced from 119 lb. to 85 lb. by 1943 and, after a partial recovery in 1944, fell further to 77 lb. in 1947. Thus, from about 93 per cent. of the United States level before the war, consumption in the United Kingdom fell to about 50 per cent. by 1947.

* *Meat*. Published for the Commonwealth Economic Committee by H.M.S.O. Pp. 91+x. Price 5s. net.

Calendars and Diaries

CALENDARS from Bamag, Ltd.; Boxfoldia, Ltd.; Doulton and Co., Ltd.; F.M.S. (Farm Products), Ltd.; Filtrol Corporation (U.S.A.); Firmenich and Co. (Geneva); A. F. Galt and Co.; L. Givaudin and Co. (Geneva); Mono Pumps, Ltd.; Geo. Rhodes and Sons, Ltd.; T. Harrison and Co., Ltd.; British Overseas, European, and S. American Airways; Selwyn Press, Ltd.

Diaries from Fredk. Boehm, Ltd.; W. J. Bush and Co., Ltd.; F. J. Edwards, Ltd.; F.M.S. (Farm Products), Ltd.; Ch. Goldrei, Foucard, and Sons, Ltd.; Gillman and Spencer, Ltd.; J. Lyons and Co., Ltd.; Barnett and Foster, Ltd.

Fresh Fruit and Vegetable Imports

THE period of validity of the open individual licences issued last year under the arrangements previously announced has been extended to June 30, 1949. As from January 1, 1949, the existing list of fresh fruit and vegetable items which may be imported under these licences ceased to have effect; it has been replaced by the following list, to which additions may be made from time to time:

Commodities.	*Countries.*
Apricots	France, F.N. Africa.
Artichokes (globe)	France, F.N. Africa, Spain.
Asparagus	France, F.N. Africa.
Aubergines	France, F.N. Africa.
Beans, green (January 1 to May 31 and November 1 to December 31)	France, F.N. Africa.
Capsicums (fresh)	France, F.N. Africa.
Cauliflower and broccoli (January 1 to February 28 and November 1 to December 31)	France, F.N. Africa, Italy.
Celeriac	France, F.N. Africa.
Cherries	France, F.N. Africa.
Figs, green	France, F.N. Africa.
Garlic	Eire, France, F.N. Africa.
Lemons	British West Indies, Cyprus, F.N. Africa, Greece, Italy, Tripolitania.
Lettuce, endive, and batavia (January 1 to May 15 and November 1 to December 31)	France, F.N. Africa, Italy, Spain.
Mandarins, tangerines, clementines	France, F.N. Africa, Greece, Italy, Spain, Tripolitania.
Mushrooms	Eire, France, F.N. Africa. Hungary.
Nectarines	France, F.N. Africa.
Onions (dry bulb) excluding the silver-skin variety (January 1 to August 15 and November 15 to December 31)	Cyprus, France, F.N. Africa, Holland, Hungary, Italy, Malta, Poland, S. Africa, Spain, Syria and Lebanon, Tripolitania.
Peaches	France, F.N. Africa, Spain.
Peas, green (January 1 to May 31 and November 1 to December 31)	France, F.N. Africa.
Pimentos (fresh)	France, F.N. Africa.
Plums	France, F.N. Africa.
Raspberries	France, F.N. Africa.
Tomatoes (January 1 to April 30 and November 1 to December 31)	Canary Islands, F.N. Africa, Jamaica, Spain.
Truffles (fresh)	France, F.N. Africa.
Turnips (new early) (January 1 to April 30 and November 1 to December 31)	France, F.N. Africa.

The dates shown in brackets against certain items in the list indicated the restricted periods during which these items may be imported, but it must be understood by all importers that under the open licensing arrangements it may be necessary at any time to discontinue or suspend without warning the further import of any of the commodities shown in the list.

The necessary arrangements with H.M. Customs and Excise have been made, and importers who already hold open licences (prefix Nos. O.S.F. for Italy and O.F.F.V. for other countries) will be allowed, without amendment to their existing licences, to import during the permitted periods the commodities mentioned in the new list.

Arrangements have been made with the Board of Trade for a copy of the revised list of commodities to be sent to all importers who are already in possession of such licences.

Applications by importers not already holding open licences should be submitted in the first instance to the Ministry of Food, Fresh Fruit and Vegetables Division, Import Section, Carlton Hotel, Pall Mall, London, S.W.1.

Importers are reminded that the importation of fresh fruit and vegetables from certain countries is subject to the provisions of the Importation of Plants Order, and the Importation of Raw Cherries Order made by the Ministry of Agriculture and Fisheries.

Cooking Frozen Foods

IT is a sign of the times that in America the cooking of frozen foods has a book* of nearly five hundred pages to itself.

Starting with an apotheosis of quick frozen foods, their convenience, quality, economy, variety, and contribution to health, the book gives a *résumé* of the principles of nutrition in four-and-three-quarter pages, one page of which covers the vitamins A to D, quite useful to the layman.

Section Two contains basic recipes for constant use and covers practically the whole gamut of food. At the beginning of each recipe is an italicised and exclamation-marked hyperbole; for instance, the recipe for curried veal casserole is headed: "*The bland flavour of veal stepped up with the tartness of apples and the spiciness of curry—perfection in a casserole!*"

A special chapter is devoted to ice cream. Here we are nearer home so far as some materials are concerned, although most of the recipes presuppose a universal possession of household refrigerators.

The book makes the reader realise the surprising range of quick frozen foods now available in the United States, and might well be appreciated in this country as a fairy-tale.

* *The Frozen Food Cook Book*. By Jean I. Simpson, Ph.D., and Demeteria M. Taylor, A.M. Pp. 493+xiii. New York. Price $2.95.

The Confectionery Industry

R. L. KENNY, B.Sc., F.R.I.C.

Progress in 1948

Once again 1948 has been a year of rationing in all forms of chocolate and sugar confectionery and frustration for the industry as a whole. This can be largely attributed to the fact that the cocoa bean position has become, if anything, even more serious, and there is as yet no indication that world demand is likely to be met out of current production.

THE cocoa bean remains one of our finest exports, as the cocoa-growing areas of West Africa are still supplying a considerable quantity of the world's requirements. As a result of demand, the price has remained at a high level during the greater part of the year, and in the absence of any subsidy this has been reflected in the home market valuation. This, of course, has had the effect of increasing the retail prices of chocolate in all manufactured forms, and there has now appeared a definite consumer resistance towards the higher price categories.

To offset partially this effect the Ministry, in December, reduced the price of West African cocoa in the United Kingdom from 225s. 6d. to 190s. 4d. per cwt. *ex* store (exclusive of duty), which will be reflected in lower retail prices for chocolate and chocolate confectionery now under negotiation with the industry and which should be passed on to the public early in the New Year.

Sugar Confectionery Costs

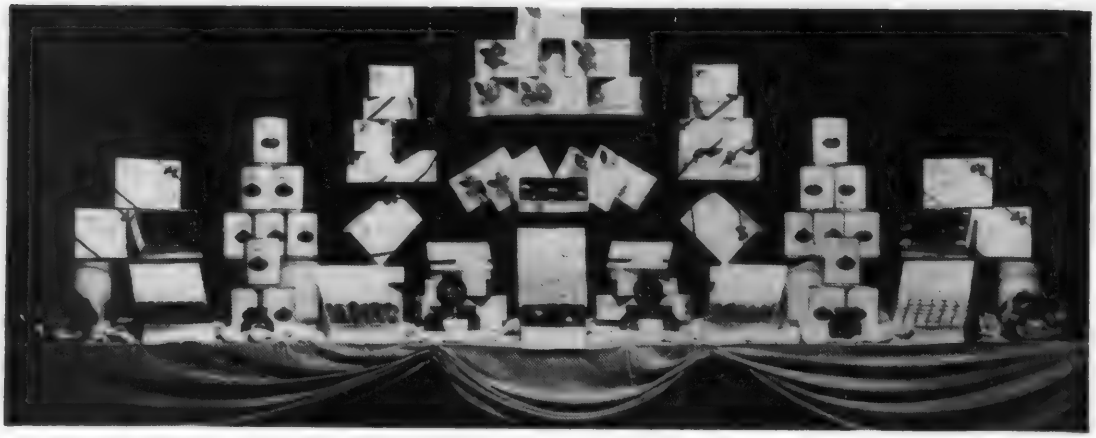
By comparison, the cost of sugar confectionery has remained reasonably stable, with the result that there now tends to be a wider divergence of price between those products containing cocoa and those which are basically prepared from sugar. Allied with this discrepancy there is also the factor that manufacturers have been given slightly larger supplies of sugar to compensate for a smaller allocation of cocoa bean, which has produced an increased quantity of sugar confectionery. While it would be unwise perhaps to predict a future trend, it would appear reasonably safe to assume that any increase in the ration which might take place is likely to be on account of increased supplies of sugar being made available.

All this has resulted in the manufacturer concentrating more and more on the production of sugar confectionery, so that he might be in a position to avail himself of the opportunities which the future may hold.

During the war years chocolate was prepared almost exclusively from West African cocoa, but in the past twelve months increased supplies of Venezuelan and allied fine grain cocoas have been made available to the industry, which has permitted blending of beans on a limited scale, thereby producing a more mellow couverture. Unfortunately the quality of this cocoa is somewhat substandard.

Cocoa Shortages

It has already been indicated that there is an acute shortage of cocoa, and that this raw material is forming one of our main exports from West Africa and the West Indies. In such circumstances it has had to be recognised that cocoa has become a major dollar earner, and, therefore, it has been necessary to restrict supplies to the home market. The main reason for this shortage is still the incidence of swollen shoot and allied diseases, which are taking heavy toll of the crops, particularly in West Africa. The Colonial Office and everyone connected with the growing, sale, or utilisation of cocoa are fully aware of the enormous devastation which can be caused by disease of this nature if it is allowed to get out of hand. As a result, research work directly sponsored by the Government has been going on, and during the year a Cocoa Conference was held in London which aimed at bringing together all those connected with the research into the prevention of disease in West Africa and Nigeria and the actual manufacturers in this country. To this Conference also were invited representatives of almost every country in the world interested in cocoa, and at the conclusion no one was left in any possible doubt as to the seriousness of the position should any of the efforts be relaxed. However, as treatment of a serious disease of this nature can only really be achieved by cutting out the affected areas and replanting in suitable fertile country, such a policy can only be viewed on a long-term basis, and it would appear that it will be some time before increased supplies of cocoa can be made available.



A display of chocolate confectionery for the export trade. *Courtesy Fullers, Ltd.*

Partial Derationing of Sugar Confectionery

A welcome announcement was recently made that in the period commencing December 5 an increase in the sweet ration would be introduced, raising the basic level from three to four ounces per week. Manufacturers were of the opinion that complete derationing of sweets and sugar confectionery could be obtained if the allocation of raw materials were raised to a level which would permit the production of a figure between four to five ounces of confectionery per person per week. The Ministry, however, were not entirely convinced that they would be justified in abolishing the complicated machinery already in operation for the equitable rationing of confectionery. In agreeing, therefore, that the ration should be raised to four ounces they considered that a scheme for partial derationing should be introduced in the New Year based upon a price level, and not upon any particular category group. While the details of this scheme still remain to be worked out, it would appear that it will be based upon the derationing of all sugar confectionery below a certain maximum price. It is a little difficult to guess exactly what the effect of this scheme will be, but the Ministry will be guided in their future action by the experience afforded in carrying out this phase of partial derationing. In order that manufacturers may be adequately equipped to produce a greater output required by the increased ration, additional raw materials have been supplied to the industry which will raise the volume of production by a further 25 per cent.

In view of the decrease during the year in the allocation of cocoa and the subsequent increase in sugar and glucose, manufacturers have been forced to spread their limited couverture over as wide a proportion of goods as possible. Clearly, the least economical method of utilising chocolate is to market it in tablet form, and there has been a general tendency to introduce more assortments and centre-filled bars to increase output with the available couverture.

Encouraging Exports

In order to capture overseas markets, manufacturers have not spared themselves, particularly in developing the hard currency areas.

One development which has been taken up is that incorporating a gift parcel scheme. Under this scheme orders are received from individuals abroad, paid for in dollars, for goods to be despatched to their relatives and friends in this country. In this way the actual confectionery never leaves the United Kingdom and the recipients under the scheme receive the recently manufactured goods in perfectly fresh condition. This facility has proved of special value to those overseas who wished to commemorate a particular anniversary.

One of the main difficulties which has arisen is in the export of chocolate and sugar confectionery to America, where very stringent micro-analytical tests have been introduced to which all foodstuffs are subjected before importation is permitted.

The Filth Test

Greater difficulties have been experienced by manufacturers of cake and biscuit confectionery, and by all those who utilise flour as a basic ingredient. Nevertheless, the micro-analytical tests employed, which, by home standards, are extremely severe, have caused considerable care and attention to be given to all goods destined for shipment to the U.S.A. American standards of hygiene are far advanced, and it has been necessary for British food manufacturers to send a special representative mission to the U.S.A. to examine the micro-analytical standards and to issue a full report on the ways and means by which manufacturers at

home could comply with the regulations imposed. The mission was afforded every opportunity of examining American technique, and as a result standard methods of micro-analysis have been established in this country which will ensure that all products can be tested before the goods are exported.

A number of laboratories have been passed as being suitable for the tests to be carried out, and certificates must be issued by competent authorities before the goods are permitted to go forward for shipment. This is in the manufacturer's interest, as it eliminates to a large extent the possibility of disappointment being experienced at a later date by the refusal of the American authorities to accept imported goods. This scheme appears to be working reasonably well, and the Ministry of Food have co-operated by making available for export specific raw materials which in themselves conform to the required standards.

There has perhaps been in this country a feeling that some discrimination was being shown against the acceptance of British goods as against those of American origin, but the view taken by the American authorities concerned is that while they have in the U.S.A. a comprehensive scheme for the inspection of factories from a hygienic point of view, they are not in a position to know the standards of cleanliness maintained in British factories, and, therefore, without that background knowledge they must be very strict in their interpretation of regulations towards imported foodstuffs. This does appear to be quite a reasonable view, but it makes it rather difficult for the manufacturer at home.

Availability of Raw Materials

One of the main difficulties during the year has been to provide a sufficient variety of centres on account of lack of ancillary raw materials. This has been particularly noticeable in the case of the chocolate assortments, where manufacturers have of necessity to concentrate on a variety. Walnuts, brazils, almonds, and hazelnuts have been imported, and have proved of considerable value in assisting production. Normally this would have heralded the return of panned goods in the form of sugared almonds, but unfortunately it is not yet possible to guarantee that all the almonds are of the sweet variety, and a proportion as high as 5 per cent. bitter is not uncommon. This has, therefore, forced the manufacturers to utilise the almonds in ground form where this slight addition of the bitter is blended in, but it has prevented their use as whole almonds. It is desirable that a stage is reached as rapidly as possible where 100 per cent. guaranteed sweet almonds are available.

Albumen Supplies

Albumen has been in extremely short supply, and this prevented the preparation of marshmallow and nougat. Attempts have been made to utilise processed lactalbumin products from Holland as substitutes, but these have not met with any great success; while they produce a certain amount of aeration in the presence of sugar, the resultant product lacks the characteristic flavour which is attained when using albumen.

Glacé fruits, such as cherries, have been obtainable, but the price of most of these has been such as to limit their use substantially in goods which must fall within a special price category.

In general, control of essential oils has remained, although there has been partial relaxation in some cases. It is considered by many that control on essential oils received from the sterling area is now entirely unnecessary, and that the trade would benefit greatly as a result of a freer market. Peppermint oil has, however, remained in extremely short

A wide range of toffees and boiled sweets.

Courtesy Geo. W. Horner and Co., Ltd.

supply, and there is probably a good case for its retention under the control scheme as large quantities are imported from the dollar areas. Consignments have, however, been received from Europe during the year, and the quality has been fairly satisfactory.

There has been an almost complete decontrol of fruit, which has permitted the preparation of pure concentrates of the soft fruit variety, but the price of this fruit from the growers has remained at a very high level as compared with that in operation before the war, and the resulting natural fruit bases have had to be fortified in order to produce a finished product which is economical in use.

As the cheaper class of confectionery, particularly those in the boiled sweets group, relies almost exclusively on the utilisation of flavour in order to introduce variety and palate appeal, it is assumed that any partial derationing of this confectionery will make manufacturers investigate closely the cost of flavourings and essential oils in the future.

Packaging Problems

The packaging of confectionery has presented quite a problem, but there were definite signs towards the end of the year, in the form of slightly larger board and paper allocations, that the situation was becoming somewhat easier. The industry, however, is still controlled on the amount of paper and board which can be utilised for individual lines, and each category of goods receives an allotment based upon the amount of protection it is likely to require in order to prevent damage in transit. The limits set are such as to prevent the packaging of chocolate assortments in rigid boxes, and consequently it is likely that the ½ lb. carton will remain as the largest unit for merchandising for some little time to come.

While the tinplate position is easier, regulations have still remained in force which prohibit the packaging of sugar confectionery in metal containers of a capacity less than 5 lb.

The increased price of chocolates, together with a continuation of 3 oz. ration has led to a consumer resistance in the sale of ½ lb. cartons of assorted chocolates, and resulted in a public demand for a smaller unit. This tendency has been particularly marked in goods of comparatively short shelf life, since the natural inclination on purchasing a ½ lb. unit is to retain it during the ration period, as it represents the majority of the total four-weekly ration.

Again the problem of storage is rapidly coming to the fore. This is something which has not concerned the industry during the last few years, because practically all goods, irrespective of quality, remained only for a negligible period of time on the retailers' shelves. The same consumer resistance, which is now making itself evident throughout the trade, means that there is a keeping problem to be taken into account.

Cocoa moth infestation, for example, of which the public has heard very little during the war years, may become a factor worthy of serious consideration, and the co-operation of the retailers will again have to be sought in order to reduce this problem to a negligible proportion. Fortunately, however, while the problem of storage of manufactured goods might again become an important factor, the period of time raw materials are held in factories prior to conversion is limited because of the scarcity of practically all the important commodities. It is unfortunately true to say, however, that while there is perhaps less deterioration of raw materials during storage on the manufacturer's premises, the degree of infestation on delivery is perhaps greater than that which existed in pre-war years. This problem is bound up with the fact that it is not always possible for the Ministry to purchase higher quality material in a world market short of commodities, and it is sometimes necessary to accept sub-standard goods in order to ensure that continuity of supply is maintained. Such a position is undesirable, but it is probable that improvements will only be effected when supply and demand are equated and free purchase of materials is once again invested with the industry.

CORRESPONDENCE

Nail Varnish

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—The danger involved in the use of nail varnish by those in the food industry is not that the lacquer will chip off and ultimately land in the consumer's plate. This may happen, but the result is far more likely to be indigestion than food poisoning. No—the real danger is that varnish covers the nail tips and makes it quite impossible even for a conscientious girl to see whether the nails are clean or not. Added to this, is the tendency of varnish wearers to let their nails grow long—considered attractive by many—since they are absolved from the tedious scrubbing and cleaning usually involved in the possession of long nails.

For these reasons, the use of nail varnish among waitresses and others concerned in the handling of food should be discouraged. Any offenders should be asked, in the middle of the day without warning, to remove their nail varnish. They and the supervisor will be horrified by what they see in an apparently clean pair of hands.

Yours faithfully,

London. M. R. NEWLANDS.

Mechanical diggers at work in Tanganyika.

The Groundnut and its Treatment

Part I

Large-scale production of groundnuts is under consideration in several countries. Most prominent centre is East Africa, where extensive jungle clearance is now in progress. When these plans begin to bear fruit attention will turn to the processing of the products. This article provides a survey of current practice and trends.

THE Tanganyika groundnut scheme, by its very scale, has caught the public imagination not only in Africa and Britain, but also in many another country. Plans for the introduction or extension of groundnut cultivation have been discussed in recent months in Australia, the Sudan, Ecuador, Peru, and British and French West Africa.

So far interest has been concentrated on the agricultural problems involved in growing groundnuts on large-scale lines on newly cleared virgin bushland. The Tanganyika scheme is still in its infancy, and the extent of its success remains uncertain. For good or ill, however, it will have repercussions upon the whole economic life of Africa, and may revolutionise the social fabric of a whole continent.

World Oil Production

From the processing point of view, the effects of the Tanganyika and similar schemes will be negligible, at least for years to come. There is a world shortage of oils and fats, due to war-time disruptions of tropical agriculture in the Far East, and the existing milling and refining capacity is only partially employed. It could, without difficulty and without expansion, cope with much larger quantities of oilseeds than are likely to mature from even a much larger project than that launched in Africa. Groundnuts are already the largest single oilseed crop in world production, amounting (by oil content) to 1,652,000 short tons in 1946, compared with 1,161,000 tons of cottonseed, 1,501,000 tons of soya bean, 638,000 tons of sunflower, 890,000 tons of olive oil, and 564,000 tons of sesame. Of palm products, coconut oil accounted for 740,000 tons, palm kernels for 283,000 tons, and palm oil for 290,000 tons.

The plant *arachis hypogaea* (groundnut, peanut, earth nut, monkey nut, or goober) is grown as an annual crop in most tropical or sub-tropical countries, requiring a light soil, with well-defined wet and dry seasons, and a rainfall of from 25 to 40 in. The plant is not of African origin, but is believed to have been introduced into Africa from Brazil, some four centuries ago, by the Portuguese. Before the war, the principal groundnut exporting countries were British India, French West Africa, and Nigeria. East Africa so far exports a comparatively small tonnage, the quantity in 1946 being only 475 tons from Tanganyika. Total production, however, is much larger, since the crop is widely cultivated by Africans for local consumption.

Adaptability of the Crop

Groundnuts are an adaptable crop and will fit readily into a large variety of rotations with sunflower, maize, millets, cassava, or cotton. A member of the pea and bean family, the plant grows in conjunction with nitrogen-fixing bacteria which have the power of incorporating the free nitrogen of the air into the plant's roots. The haulms, after proper curing, can form a valuable fodder for livestock, though when ploughed back

A bulldozer clearing the bush.

into the soil, they greatly help to restore the plant food lost in harvesting the nuts. The nut itself, though it develops underground, is actually the fruit of the plant. After flowering, the stalk turns down and pushes its way into the soil, where the pod ripens.

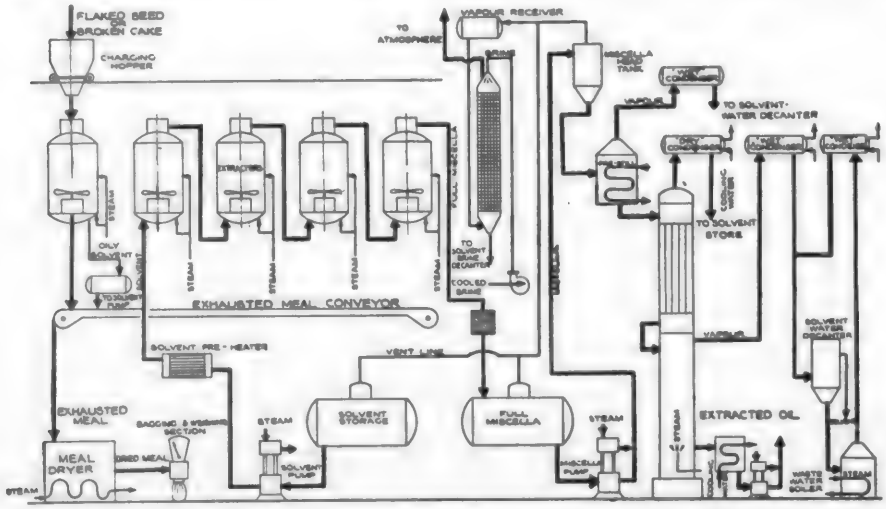
The main use of groundnuts is as a foodstuff. Large quantities are widely consumed whole—either roasted or raw—and are used in the confectionery trade and for making peanut butter. Considerable quantities are also used in the production of groundnut oil, which is largely used in the manufacture of margarine, cooking fats, salad and frying oils, and as a substitute for olive oil. In America, about 90 per cent. of the groundnuts produced are consumed whole, and about 10 per cent. pressed for oil; in Britain and other countries, the position is practically reversed, the major portion of imports being converted into oil and thence into margarine.

The oil content of the groundnut is about 42 per cent., and the residual press cake, left after the extraction of the oil by pressing, forms a valuable cattle food containing about 45 per cent. of protein. The composition and nutritional value of groundnuts have been very thoroughly investigated, and they have been shown to contain substantial quantities of the three primary dietary necessities: protein, carbohydrates, and fat. Because of their relatively low moisture and high fat content, they are an extremely concentrated form of food, with 5·8 Calories to the gram, as compared with 2·3 for beef-steak, 3·6 for whole wheat, 2·6 for white bread, and 4 for pure cane sugar.

The fat contained in groundnuts is of high nutritional value, with from 20 per cent. to 25 per cent. of linoleic acid.

Protein Values

The proteins present in groundnuts have not been fully characterised. Two globulins, arachin and conarachin, containing all the essential amino acids, are reported to comprise the greater part of the protein, but some of the amino acids are in less



A semi-continuous process for solvent extraction of groundnut oil.

Plant used for the hydrogenation of refined groundnut oil. *Courtesy Bamag, Ltd.*

than nutritionally optimum amounts. The carbohydrate content of groundnuts is relatively low, averaging about 20 per cent., and is made up of starch and sucrose, which are digestible, together with pectin, cellulose, and other substances which are probably of no nutritional value.

Groundnuts contain vitamins A, B_1, riboflavin, and nicotinic acid. Other members of the B complex, including pyridoxin and pantothenic acid, and appreciable quantities of tocopherols are known to be present in groundnuts, which are, however, almost devoid of vitamins C and D.

So far as minerals are concerned, groundnuts contain phosphorus, calcium, and iron in nutritionally significant quantities. Traces of copper, boron, manganese, and zinc have been detected spectroscopically.

Other substances of nutritional importance that have been shown to be present in groundnuts to a significant degree are choline and the phosphatides, lecithin and cephalin.

Primary Processing

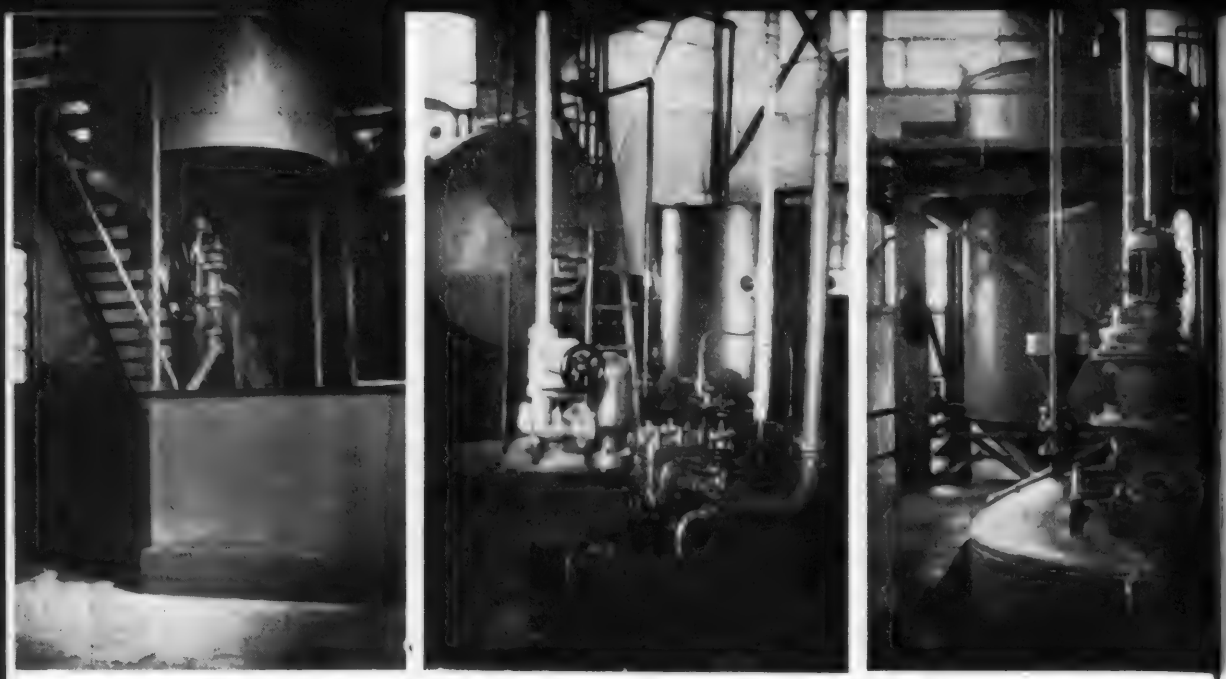
After the groundnuts are harvested, they must be shelled, cleaned, and sorted. Shelling, or decortication, is carried out by passing the nuts through hullers which split the seed open between revolving knife edges or corrugated rollers and then through hull beaters, which shake or beat out the seed kernel from each nut. Separation of the kernels from the shell and adhering soil can be carried out in many ways, varying from the primitive wind winnowing of native growers to complicated systems of vibrating screens combined with air separators, or pneumatic lifts.

After cleaning, the nuts are ready for consumption raw or for roasting or processing for one of the patent foods such as are sold in the United States. Where oil extraction is undertaken, however, further preparation is involved. This consists of rolling, in which the separated kernels or meats are passed through heavy, steel rolling mills to form flakes approximately 0·005 in. in thickness, or are comminuted into sections about a quarter of the size of the original nut. Rolling or comminuting does not seem to result in any considerable disruption of the fat cells, but merely makes them more readily accessible to the action of heat and moisture.

Oil Extraction

The extraction of oil from groundnuts differs very little in method from that of other oilseeds; the same processes are used, and in many cases the equipment can be switched over at a moment's notice from groundnuts to cottonseed, sesame, or other product. Four methods can be adopted—hydraulic pressing, low-pressure expelling, high-pressure expelling, and solvent extraction. In modern practice, however, a preliminary low-pressure expelling process is usually adopted followed by a secondary processing by one of the other methods.

Before pressing or expelling, the rolled meats are cooked for approximately one and a half hours in a steam-heated cooker in the presence of live steam. The cooking temperature is about 225° F. to 230° F. In some cases, a pressure cooker is used, in which case the temperature is about 260° F. and the cooking time fifteen to twenty minutes. The cooking treatment coagulates the proteins in the



Left: **Base of the bleaching vessel and wash water oil trap.** *Centre:* **Filter press pump with vacuum cooler and deodorised oil storage tank in the background.** *Right:* **Top of the bleacher and** (*background*) **neutraliser.**
Courtesy Power Gas Corporation, Ltd.

cell walls, which are thus made permeable to the passage of the oil.

The traditional method of oil extraction is by the hydraulic press, and this method is still widely used. The presses used are usually of the vertical plate type. The groundnut kernels are placed in a mould about 2 in. deep, wrapped in a woollen or hair cloth. Fifteen or sixteen moulds are placed in a single press and pressed for an average of forty-five minutes, with a pressure at the ram of about 1½ tons to the sq. in. About 94 per cent. to 95 per cent. of the oil is removed by this process. After pressing is completed, the cake must be removed from the moulds by hand and the edges that have extruded from the press plates pared off for re-pressing. The cake is then cut or broken into suitable sizes for agricultural use.

Types of Press

The latest type of press is equipped with fine metal plates that obviate the need for cloth filter pads during the expression of the oil.

The main disadvantage of the hydraulic press is the high labour costs involved. The work is arduous and unpleasant, since the press cake is heavy, oily, and hot, and mechanisation is difficult, if not impossible. For this reason, the hydraulic press is giving way to the newer expeller and solvent extraction processes, though the change-over is not likely to be very rapid. Hydraulic presses, once installed, will continue to be used where labour is available.

With the continuous screw press or expeller, mechanical handling methods can be employed to a much greater extent, while the pressing process can be controlled more accurately. In practice, two stages are necessary. In the first, some 20 per cent. to 25 per cent. of the oil is removed in a low-pressure expeller and the remainder obtained by passing the cake from the first through a second, high-pressure, expeller. It is not possible to carry out the process in a single stage.

The press cake from expellers emerges in the form of a continuous stream of separate flakes, and some difficulty was experienced initially in getting farmers to accept these as feed. This resistance, however, has now been largely overcome, and there is reason to believe that most farmers today prefer expeller cake to hydraulic cake, as it is easier to handle.

Solvent Extraction

Even under optimum conditions, mechanical methods of expression produce an oil cake retaining from 4 per cent. to 5 per cent. of its own weight of oil. By the use of solvent extraction methods, the residual oil in the cake can be reduced to 1 per cent. or less, with a corresponding increase in oil recovery.

The preparation of oil seeds for solvent extraction is similar to that already described for mechanical expression, except that the cooking operation is omitted.

In the simplest form of solvent extraction, the kernels are simply agitated in batch extractors with successive charges of solvent, usually petrol, though any hydrocarbon without the benzene ring may be employed. In most cases, however, a

battery of extractors is used, the first extractions of each charge being carried out with the miscella, or oil-solvent mixture, resulting from previous contacts in other extractors.

A number of continuous processes for the solvent extraction of vegetable oils have been devised, but these have not so far been widely used for processing groundnuts, partly because of technical difficulties and partly through economic factors. The flakes of groundnuts are inclined to disintegrate to some extent under the influence of the solvent, with the formation of fine particles which are difficult to separate from the miscella, and which impede its uniform circulation through the flake mass. Consequently, the difficulty of moving the seeds mechanically and the solvent in opposite directions, with free intermixing, are considerable.

Basic Methods

There are two basic methods of contacting oil seeds and solvents. In the one, the extractor has the form of a bucket elevator, and consists of a series of large, perforated buckets which are slowly raised and lowered by an endless chain within a gas-tight housing. The seeds are contained within the buckets, which are both charged and discharged at the top of the housing. The solvent is introduced at the top of the system in the form of a spray and percolates downward through the successive buckets on the ascending side of the chain, while a stream of miscella drips in a similar manner through the descending buckets. The finished miscella is drawn off from the bottom of the housing.

The second type of extractor consists of three large tubes arranged in the form of a "U." Perforated screws convey the seeds downward through one leg of the system, horizontally across to the bottom of the second leg, and then vertically up the other leg and above the level of the solvent in the latter. The solvent is pumped in a direction opposite to that taken by the seeds.

Necessary accessory equipment for any solvent extraction system includes meal driers, stripping stills, water separators, and condensers to effect an efficient recovery of solvent from the miscella and from the extracted residue. The entire system must, of course, be closed to avoid fire hazards, occupational diseases, and excessive loss of solvent.

Continuous solvent extraction plants are inherently of such a nature as to be economical only in relatively large sizes. A capacity of 50 tons of oilseeds a day is considered close to the minimum size and capacities of 100 to 400 tons are common.

Solvent extraction is most advantageous with seeds of comparatively low oil content; with seeds of high oil content, such as groundnuts, it is common to use a preliminary extraction with a low-pressure expeller before final extraction by solvent extraction methods.

(*To be continued*)

Fear Saps Efficiency

AMONG the many ills that our flesh is heir to, fear is not one which we hear much about. Yet it is said that nearly a quarter of all absenteeism in industry is due to fear-neurosis of one kind or another. From the evidence of more than 50,000 letters received by John Langdon-Davies, he has arrived at definite conclusions concerning causes, effects, and cures of this state, which he has embodied in a little book.*

The author begins with a critical analysis of the Government investigations into the incidence of neurosis among factory workers. This investigation revealed that 10 per cent. of the workers studied had been disabled during the previous six months, through states of mild depression, anxiety, obsession, and other nervous disorders, while almost 25 per cent. of all absenteeism is due to various forms of what the author calls "fear-sickness."

"Nerves" Affect Capacity for Work

The general conclusion to be drawn is that the capacity for work of three in every ten of the workers studied was affected by what is usually termed "nerves" because they were sufficiently "unhappy" for it to impair their efficiency. The chief cause of this unhappiness was discovered to be such factors as loneliness and lack of friends, boredom through having no hobbies, and family worries. The author then utters a warning that should be repeated again and again: "The findings of the report that I have quoted give valuable evidence that it is not the economic factor which is the chief cause of this anxiety and sense of insecurity."

To quote again: "This trouble is quite unlike any other human ailment . . . fear-sickness is catching . . . so long as there are individuals in our community who suffer from fear-sickness, everybody in some way or another suffers. For the disease is not one of individuals: it is the disease of relations between individuals."

This book in no way seeks to do the job of the doctors or the psychiatrists; it does not claim to produce cures. Its chief concern is to state in human terms a human problem which concerns everybody. It could be read with special advantage by those whose task it is to handle labour.

* *Conquer Fear!* By John Langdon-Davies. Pp. 173. London. Price 5s. net.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Food Packaging

Progress in 1948

FRANK ENGLAND

Although restrictions and shortages continued in 1948, it has been a more hopeful year in the packaging industry, and one of development in which every department has shared. The raw materials position has eased somewhat and home production of paper and board is increasing. Re-styling of famous packs has been undertaken, or continued, by far-seeing manufacturers.

WHEN FOOD MANUFACTURE, in its 1947 food packaging review, referred to the formation of the Institute of Packaging as one for which the year might be remembered, the suggestion may have seemed venturesome and even an exaggeration.

Today the Institute, which in 1947 had 200 members, can boast of a membership of over 600, which extends to the Dominions and Western Europe.

Growth of the Institute

It can point to the establishment in 1948 of two branches, a Northern Branch centred on Manchester, and a Midlands Branch centred on Birmingham. As to membership, it can say that its members include industrialists, users of packaging, makers of packaging machinery, paper and board manufacturers, senior Civil Servants, scientific packers, and consultants. Future activities include the extension of its information and technical services, and the National Packaging Exhibition to be opened in October, 1949, at Manchester. In preparation for this, the Institute is co-operating with Provincial Exhibitions, Ltd. The exhibition is to be held in the City Exhibition Hall, which has 30,000 square feet of floor space. Food manufacturers taking part may rely, therefore, on ample room being available for bold displays.

During 1948, authoritative papers, presented before members of the Institute, have covered many aspects of packaging, and have opened freely to discussion points which at one time would have been considered "hush hush." A paper on the packaging of quick frozen foods by P. G. Gates of Konevale Packing Station contained a wealth of information not only on the packaging of such foods but on quick freezing processes.

Packaging Research

From the Packaging Institute, it is a logical step to the Printing, Packaging, and Allied Trades Research Association which, after years of difficulties occasioned by lack of accommodation, has moved at last to its permanent laboratories at Leatherhead. Its work, which was continued throughout the year, will now be able to go forward under more favourable conditions; its package testing station, when complete, will offer testing facilities not excelled anywhere. *Packaging Abstracts*, published monthly, has dealt with many developments concerned with food packaging at home and abroad. They cover technical and scientific matters only, and at present are limited to those branches of the packaging industry which are concerned with the production of packages made from paper, paper products, plastic films, metal foils, etc. The reports are concerned with raw materials, treatment, and proofing of packages, and packaging materials, adhesives, heat sealing and thermoplastic coatings, laminating and

Pudding packs with brightly coloured labels enhance sales appeal.

These biscuit containers feature the "flash" which is gradually becoming associated with Peek Frean products.

combining machinery, special containers and packs, the packaging of products, marking, sealing and assembly, handling, transport and storage, and the properties and testing of packages and packaging materials. In due course, their scope is to be extended to packages of all kinds, including tin cans, steel drums, glass bottles, wooden boxes, and textile sacks.

A recent development of special interest is water-vapourproof coatings which adhere to regenerated cellulose, even when subjected to high temperature, or when in contact with water for a long period, as the water in frozen foods, cheese, and butter. Other new films noted have special qualities, such as exceptional cleanness, and toughness at low temperatures. Further developments in regenerated cellulose overwraps make it feasible to extend the principles of self-service retailing to many fresh fruits and vegetables, by packaging them before they are displayed in shops where there is adequate refrigeration.

Design in the Industry

The suggestion was made in 1948 that the packaging industry should establish a "design centre." It is significant that a similar proposal in the printing industry has been received with hesitation. There can be little doubt that similar hesitation will be shown in an industry so much subdivided into departments as packaging. Nevertheless, great attention is being paid to design. The food trade in some respects is a shining example. For some time, far-seeing firms in the industry have been preparing for a world-wide buyers' market, in which even long-established products will meet increasing, and ultimately, harsh competition.

Among these may be quoted Maconochie Bros., who have not only designed and re-designed many packs, but in doing so have braved tradition, particularly in connexion with their fish pastes, sauces, canned fruits, and vegetables. Pan Yan and Mustang are now packed in a specially designed bottle which has a large mouth and coloured plastic cap instead of the usual metal top. The bottle is distinguished by a streamlined appearance and by good proportions. The mouth is wide enough to admit a spoon freely, thereby discouraging the habit of pouring pickles, which tends to lead to a formation of incrustations at the neck and shoulder, with consequent waste. Thus, the design offers a new convenience to the customer, catches and pleases the eye, and satisfies the Ministry of Food.

Maconochie go heavily against design traditions in the labelling of their canned fruits and vegetables, a field they entered in 1948. Traditionally, labels of this kind illustrate the canned contents in colours. Maconochie decided on all-text labels in well-chosen and well-arranged types, printed on a coloured background, reminiscent in hue of the contents. These labels are remarkably successful in suggesting an appetising freshness and hygiene. More than this, the labels have a "family" resemblance which lends itself to effective counter and shelf display, and has great "reminder" value. Maconochie have not given up the idea of contents illustration, but they are deferring it until the time when a better paper supply position will permit them to use showcards in central displays capable of taking the finest colour reproductions that can be turned out.

Fish Pastes in Light-weight Glass

They also break tradition with their fish pastes by packing them in bottles made of "light-weight glass," developed during the war by the glass industry. Though lighter in weight, this glass is strong and serviceable. It has the disadvantage that 3 oz. of paste can be packed in a bottle that looks smaller than the traditional heavy based, thickly ribbed bottle, which may, in addition to its unnecessary thickness and deceptive decoration, have air spaces. Against the disadvantage attached to a bottle that appears smaller by comparison than it really is, are the advantages that the light-glass bottle looks more attractive, is stronger, packs more economically (both vertically and horizontally), and saves considerably in carriage costs. Furthermore, it is believed that the trade will ultimately move over to this glass, by

An attractive type adopted for Maconochie's soup packs.

which time their packs will have become established leaders.

Another example of close and continued attention to packaging and design in the food trade is offered by Peek Frean, whose Vita-Weat and Mrs. Peek's Puddings of various kinds have been restyled. This firm has followed the principle of fitting design to policy, the final designs representing the fruits of the closest co-operation between manufacturers and designers.

These examples, two among a number, are sufficient to indicate how design of package and label in the food trade is likely to be approached for some time to come.

Tinplate Supplies

The tinplate supply position in 1948 has remained much the same, with restrictions continuing. Nothing really new has been developed for food packs, although there is a move towards using aluminium for certain foods. This has been encouraged by the Norwegian use of aluminium for packaging fish. In considering aluminium, the difficulty has to be faced that soldering cannot yet be done at high speed. Tentative experiments are being made to see whether the soldering of aluminium can be made automatic, but the possibilities of this being achieved at an early date are considered remote. Mention may be made of a container that has been produced under the trade name "Plastin," which has transparent walls of plastic material and the top and bottom of tinplate or aluminium.

Plastic Closures

Packaging departments in the food trade have shown increasing interest in plastics. Plastic closures of all kind grow in popularity. Special attention is being paid to the possibilities offered by plastic film. This will, no doubt, increase with the early opening of the factory at Wolverhampton for the manufacture of the transparent hydrochloride products marketed under the name "Pliofilm." These possess many properties which were outlined in some detail in our 1947 review.

Another and fairly recent production is film made from polythene. Its appeal to the food trade is that it is odourless and tasteless, inert to chemical attack, tough, and flexible. Because of its resistance to chemicals and solvents, it is finding favour for bottle cap liners. Some trouble has been met in printing on polythene, and a really suitable adhesive for it has still to be developed so far as this country is concerned. Polythene is described as eminently suited to the packaging of liquids, such as vinegar, oils, and similar foodstuffs. It is also said to make a good protective pack for frozen foods.

Uses of Polythene

Polythene has great possibilities as a coating agent, particularly in coated paper for milk containers and other packs where the important consideration is that the pack shall be odourless and tasteless, as well as impervious to moisture, chemicals, and fats.

Plastics will not solve all problems. In most cases their uses are specific, but no progressive food manufacturer will fail to see that he is kept abreast of the advances that are being made in this field of packaging, and he will not neglect the possibilities offered by heat-sealing.

Interesting in the field of sealing tapes and adhesives has been the series of displays and demonstrations organised by Samuel Jones.

These exhibitions will continue in 1949 with a display of fancy papers and stay paper for box-making; adhesives for all trades; self-ad-

This specially designed bottle has a wide mouth which easily admits a spoon.

hesive paper, cellulose and cloth tapes, and self-adhesive labels; trade gumming and finishing work; and an exhibition of Bakelite, Ceresine, and other special coatings. The full programme of the displays will not be completed until May 13, 1949.

Among new developments that have been put on exhibition is the Wyda Sealer, which takes adhesive tape up to 12 in. wide. There were also smaller machines like the "Counterboy," which have a transparent plastic water holder.

Food packers have welcomed the return in 1948 of odourless glue, the use of which was generally dropped during the war owing to controls, and odourless sealing tapes.

If 1948 has not been an exciting year in packaging, it has been encouraging, and 1949 may well be a year in which some rapid advances will be seen, although restrictions, if somewhat eased, will be continued.

Trade Exhibition Policy

SINCE the war Government policy on trade exhibition questions has been based on the report of the Ramsden Committee, which considered the whole question towards the end of 1945. Doubt has recently been expressed in some quarters as to how far the validity of the Committee's recommendations may have been affected by the trend of post-war economic circumstances which could not have been foreseen clearly. New projects for exhibitions in various forms are constantly being put before the Board as offering a useful contribution to the solution of external trade problems, and the value of a standing committee of experienced business men to advise on such projects in the light of current conditions has been appreciated for some time.

Exhibitions Advisory Committee

To meet this need an Exhibitions Advisory Committee has been set up under the chairmanship of Sir Guy Locock, a Vice-President of the Federation of British Industries and a member of the Ramsden Committee. The majority of the members will serve in a personal capacity, although the major industrial organisations have nominated their representatives, and the Committee will afford a cross-section of those most closely concerned and most experienced in export problems.

The terms of reference are:

1. To advise the Board of Trade, in the light of the report of the Ramsden Committee, on questions of official participation in, or sponsorship of, exhibitions and trade fairs both in the United Kingdom and overseas, and on any general question of exhibition policy as may be necessary.
2. To advise the Board of Trade on proposals by industry or sections of industry or by other interests active in promoting exhibitions or trade fairs brought to the notice of the Committee by the Board of Trade.
3. To make such suggestions to the Board of Trade as may seem desirable in order to promote and co-ordinate national action with regard to exhibitions and trade fairs.
4. To appoint such sub-committees as the Committee may consider necessary to carry out the above functions.

A preliminary meeting has been held to consider the Committee's field of activity.

Official Participation During 1949

It has been necessary to draw up the 1949 programme of official participation in trade fairs overseas without waiting for the views of the new Committee. So far as overseas trade fairs are concerned, the number of pressing invitations increases rather than diminishes each year, and the choice has been a process of elimination.

The basis upon which this choice has been made represents a compromise between

(*a*) the desirability of the market concerned from the national point of view;
(*b*) an assessment of the serious character of the fair concerned;
(*c*) the extent to which United Kingdom participation has previously been secured (the criterion recommended by the Ramsden Committee); and
(*d*) the undesirability of expending the limited official effort too frequently at the same events to the exclusion of other useful ones.

Negotiations are at present in progress for suitable sites, and it appears likely that official information stands will be installed at Poznan, Toronto, Stockholm, and Utrecht during the year.

A Professor's Hobby

EDOUARD DE POMIANE, professor at the Pasteur Institute in Paris, is a well-known scientist and teacher, but he has also adopted cooking as a hobby, and this has become just as important a part of his life as his science.

Many years ago the necessity of producing, and enjoying, a good meal in his very short lunch hour led M. de Pomiane to write a cookery book* for busy people like himself. More than 50,000 copies were sold, and the author became famous on account of his cookery as well as his teaching.

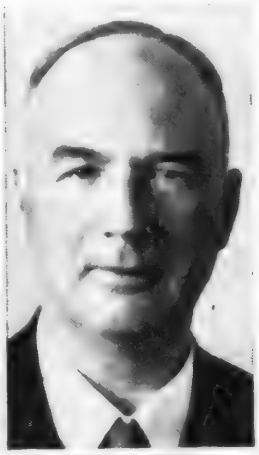
M. de Pomiane has led a full and rich life, meeting innumerable people, many of them artists, scientists, and politicians, with a kindred love of the fine art of food and drink. Even today in the world of scarcity and trouble he has kept his taste and humour, and, although life is hard in harassed France, he enjoys every minute of it. This is reflected in the charming style of his book. The drawings of Toulouse-Lautrec further brighten it up.

* *Cooking in Ten Minutes.* By Edouard de Pomiane. Pp. 145. 19 woodcuts. Oxford. Price 9s.

The Anti-vitamin Theory

Although the term " anti-vitamin " has only recently come into general use it has long been realised that certain foods contain " toxamins " which interfere with the action of vitamins. Thus we have known for some twenty years that wholemeal flour contains a factor which increases the body's requirement for antirachitic vitamin D. A fascinating new field of research, however, has been opened up by the synthesis of many artificial " anti-vitamins," some of which have great medical importance in the treatment of bacterial diseases. The physiological significance and modes of action of anti-vitamins, and the complications which they present to analysts estimating the vitamin contents of foodstuffs, were discussed at a recent conference of the Nutrition Society, under the chairmanship of Sir Edward Mellanby, G.B.E., F.R.S.

IN tracing the history of the anti-vitamin theory it is important to realise that substances and mechanisms of many different types are capable of interfering with the action of vitamins. Thus factors present in the food may destroy the vitamin, inhibit its absorption from the alimentary tract, prevent its synthesis by the intestinal bacteria, or oppose its influence on the bodily functions. In each of these instances the vitamin and the interfering factor are usually widely different in their chemical properties. Peroxides present in fats, for example, will inactivate vitamins A and E, to which they bear little structural resemblance. On the other hand many synthetic anti-vitamins, differing only from the corresponding vitamins in minor structural details, exert their interference in a much more specific manner. Many vitamins take part in essential enzyme systems, and in the co-ordination of these systems the body appears to be unable to differentiate between the true vitamins and their synthetic analogues. Presumably this quandary results in the formation of a high proportion of ineffective " counterfeit " enzyme molecules, with a corresponding reduction in the number of genuine active molecules.



Sir Edward Mellanby, G.B.E., F.R.S.

Dr. E. Kodicek considers that in order to discriminate between specific and non-specific interference with the action of vitamins we should retain Mellanby's old term " toxamin " to indicate all substances which cause interference, while using the term " anti-vitamin " only for structural analogues.

As Dr. L. J. Harris points out, theories on the existence of toxamins in food were actually propounded before the vitamin theory of deficiency diseases became firmly established, as the result of the classical experiments of Sir F. Gowland Hopkins. Professor Eijkmann, who shared with Hopkins in the honour of a Nobel Prize for the discovery of vitamins, noticed that when he fed his hens on polished rice they developed polyneuritis, while these nervous abnormalities could be cured by the restoration to their diets of the parts of the rice removed in polishing. He therefore assumed that the rice contained a substance toxic to his birds, while the polishings contained an antidote.

Hopkins, however, was able to prove the reality of deficiency diseases, which are caused merely by the absence of an essential vitamin from the diet without the intervention of a toxic substance. Eijkmann's early forecast of the toxamin theory, therefore, proved incorrect, since his polished rice contained no constituent which was toxic in the ordinary sense of the word. Many years later, however, American workers found that a diet high in carbohydrate demands a correspondingly high intake of the anti-neuritic vitamin B_1. Eijkmann would therefore have been correct if he had claimed that the high starch content of his hens' diet had predisposed them to polyneuritis, and starch might be claimed to be a toxamin at least in this limited sense.

Phytic Acid as a Toxamin

Sir Edward Mellanby, however, must be credited with the first observations which led later to the firm establishment of the " toxamin " theory. More than twenty years ago he noticed in experiments on the production of rickets in dogs that coarse

cereals, and particularly oatmeal, greatly increased the tendency to this disease. This important discovery was followed up some years later by Bruce and Callow, who found that phytic acid, a constituent of cereals which is most abundant in the coarser fractions, had the property of interfering with the absorption of calcium from the intestines. Further links in the chain were forged when Professor D. C. Harrison and Mellanby proved that when phytic acid was given to dogs it had the same rachitogenic effect as cereals, while Professor R. A. McCance, F.R.S., found in human feeding trials that a diet consisting mainly of wholemeal flour caused a defective absorption of calcium.

The chemical constitution of phytic acid, as a phosphorylated form of inositol, or hexa-hydroxybenzene, is of considerable interest. Inositol is classed as a vitamin, and acts as one of the several "lipotropic" factors concerned in the mobilisation and transport of fat in animals. Its close resemblance to the insecticide hexa-chloro-benzene, commonly known as Gammexane, is readily apparent.

Other Rachitogenic Toxamins

Rachitogenic properties, not ascribed to phytic acid, have also been observed in animal feedingstuffs. Thus dried yeast is an excellent source of protein and B vitamins for pigs, but Dr. S. K. Kon and his colleagues have found that its inclusion in the diet in substantial amounts causes rickets unless an adequate supplement of vitamin D is also given. For this purpose a small allowance of the same yeast activated by ultra-violet irradiation may be successfully employed.

According to Dr. T. K. Ewer, sheep reared in the south island of New Zealand often develop rickets when they are fed upon the young green plants of oats and other cereals, but the malady may be prevented by cod liver oil and other sources of vitamin D. Exposure of the animals to sunlight, however, does not have the beneficial effect that would be expected; the animals are, in fact, most liable to rickets when bright sunshine causes rapid growth of the cereal plants.

Natural Inhibitors of B Vitamins

It would be expected from the number and chemical diversity of the components of the vitamin B complex that the investigation and classification of the corresponding toxamins would present a very complicated problem. According to Dr. Kodicek naturally occurring toxamins have already been reported in relation to several, but by no means all, of the B vitamins.

In early experiments it was observed that rats kept upon a diet containing raw egg white became very ill unless they were given liberal supplements of B vitamins. Later the egg white was found to contain a toxamin, given the name of avidin, which prevents the absorption of biotin. More recently several toxamins interfering with the action of vitamin B_1 have been reported. Enzymes capable of destroying the vitamin are present in certain kinds of raw fish and in a species of fern which is sometimes eaten by cattle. The consumption of live yeast is also said to involve a risk of vitamin B_1 deficiency, since according to some workers the organisms do not contribute their own vitamin B_1 to the consumer but actually remove vitamin from the intestinal contents in passing undigested through the alimentary tract. Nicotinic amide, the main factor concerned in the prevention of pellagra, is inhibited by toxamins present in maize, which explains why maize-eating populations are so prone to this disease. Streptogenin, a factor necessary for the rapid growth of bacteria, has its antagonist in lycomarasmin, which is present in a fungus which causes wilting in tomato plants.

A Haemorrhagenic Toxamin

The ability of blood to clot at a normal speed depends on several factors, of which vitamin K is one of the most important. A toxamin inhibiting this vitamin was discovered in America by Link in a study of a disease caused in cattle by the consumption of faultily cured sweet clover. The animals developed severe haemorrhages, which were sometimes fatal. Examination of the offending clover indicated that the toxic factor represented only a small proportion of the coumarin fraction, and it was subsequently isolated and identified as dicoumarol.

Extensive experiments with rats and other animals have proved the general applicability of the antagonism between vitamin K and dicoumarol, and since the two substances bear some degree of chemical similarity dicoumarol may perhaps be regarded as an anti-vitamin rather than merely as a toxamin. Dicoumarol has been used in medical practice to decrease the clotting power of the blood in the treatment of thrombosis. The risk of haemorrhage through overdosing, however, is always present, and prompt reversal of the treatment with vitamin K is sometimes necessary.

Toxamins in Fats

According to Dr. T. Moore, fats, especially when highly unsaturated, may interfere with the action of the fat-soluble vitamins in several different ways. Thus it has long been known that carotene is unstable if dissolved in fats free from antioxidants, while if the fat already contains peroxides the loss of yellow colour may be rapid. Preformed vitamin A is equally unstable, while vitamin E, although itself an anti-oxidant, is readily destroyed by rancid fats. Oxidised fats may therefore be regarded as toxamins if the term can be extended to cover substances which attack vitamins even before the food is consumed.

With unsaturated fats, however, and particularly with marine liver oils, the antagonism with vitamin E is continued in the intestines and tissues of the consumer. To cause certain forms of injury in the tissues, however, the oil must be fresh, and not in the oxidised form which would cause the destruction of vitamins in foodstuffs. In experiments on vitamin E deficiency in chicks Dam found that fresh cod liver oil increased the tendency to defects in the blood capillaries, while this effect was not shown by rancid oil.

Vitamin A as a Toxamin

The administration of vitamin A to rats in doses thousands of times greater than their normal requirements causes fractures of the bones and severe internal haemorrhage, injuries typical of vitamin C deficiency, and also a reduced clotting power of the blood, typical of vitamin K deficiency. While opinions are divided as to whether the administration of vitamin C causes any amelioration of the bone lesions and haemorrhage there is no doubt that dosing with vitamin K restores normal clotting power to the blood. It is of some theoretical interest, therefore, that one vitamin when given in very great excess may act as a toxamin in regard to another vitamin.

While the risk of hypervitaminosis A in the human subject is very remote, occasional instances of injuries rather similar to those seen in rats have been reported from America. Thus symptoms at first diagnosed as scurvy were observed in a young child who had been dosed repeatedly, through a fond mother's mistaken enthusiasm, with very large amounts of vitamin A in the form of percomorph oil.

Synthetic Anti-vitamins

So far toxamins present in natural foodstuffs have been dealt with. We may now turn to the synthetic anti-vitamins, which are of greater interest for their potentialities as drugs than as nutrients. The first synthetic anti-vitamins, the sulphonamides, were in fact discovered as agents for the control of bacterial infections before their role as anti-vitamins was recognised. The first clue that they might function in this way was provided by the important discovery by Woods and Fildes that the sulphonamides exert their bacteriostatic action by obstructing the metabolism of *p*-aminobenzoic acid, which they resemble in chemical structure. The second finding was that *p*-aminobenzoic acid is an essential nutrient for bacteria and for animals. It has therefore been classed as a vitamin, while the sulphonamides may be considered to be anti-vitamins.

In addition to their value in medicine the sulphonamides have proved most useful agents in nutritional research when it is desired to suppress the activities of the intestinal baeteria in synthesising vitamins. Deficiency of pteroyl-glutamic acid, for example, may be induced in rats by including sulphathiazole in their diets.

Numerous structural analogues have also been synthesised in relation to aneurin, riboflavin, nicotinic amide, biotin, vitamin B_6, pantothenic acid, inositol, and choline. Few have yet shown promise of rivalling the sulphonamides in their bacteriostatic action. Synthetic K anti-vitamins, including phenyl indanedione, have been studied in France by Professor Paul Meunier.

Anti-vitamins in Vitamin Estimations

As Dr. L. J. Harris has pointed out, the recognition of anti-vitamins has added yet another difficulty to those already faced by the analyst engaged in estimating vitamins in foodstuffs. It has long been recognised that two distinct alternative procedures are usually available. The vitamins, in most cases, may be accurately estimated by chemical methods, which will tell without equivocation the actual amounts which are present. On the other hand the analyst may prefer to feed graded amounts of the foodstuffs to animals deficient in the vitamin which he wishes to estimate, and from the growth responses or other biological criteria may again estimate the vitamin value. Quite possibly the two results may disagree widely, and the analyst will have to decide which value be considered correct.

Digestibility of Foodstuffs

Obviously the full answer to this question will demand a study of the digestibility of the foodstuffs, and of the efficiency of absorption and utilisation of the vitamin under investigation by the particular animal used for the tests. Such questions are beyond the scope of this report, but the presence or absence of anti-vitamins in the foodstuffs also deserves consideration. How should an analyst, for example, face the task of estimating vitamin D in a whole-meal foodstuff which has been artificially fortified with calciferol? Should he carry out biological tests on the whole food, and so get a low result by including phytic acid, or should he first extract the vitamin by chemical means and so obtain a higher result?

We can only conclude that the expressions "vitamin contents" and "vitamin activity" may sometimes have widely different meanings. Whether we consider one or the other as being correct depends on the precise information which we desire to obtain. It is plain, however, that data on the vitamin values of foodstuffs should always be qualified by a statement of the method of estimation employed.

Fermentation in Concentrated Orange Juice

Part I

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This article deals with a situation which arose in an acute form as a result of war-time conditions; but the observations are relevant to the handling of other fruit juices and fermentable products under normal conditions.

SINCE 1942, the supply of concentrated orange juice for the Welfare Food Service of the British Ministry of Food has been provided by the importation of juice in cans, concentrated to 65° B. This material has, until lately, come entirely from the United States where it is a familiar article of commerce.

Between manufacture and shipment, the juice is usually kept in cold stores by the manufacturers. During the war it was shipped at ordinary temperatures, which might involve several weeks of warm weather; since, it has been shipped under refrigeration. On arrival in Britain, it is again put in cold storage, and samples are at once removed for examination by the Ministry. If these are satisfactory, the batches of juice are allocated to bottlers as required. These firms, on the basis of further analyses, blend the various juices together with a little sugar syrup so as to yield a mixture of standard composition, which is issued in 6 oz. bottles to the Ministry's distributing centres for issue to the public. Neither the bottlers nor the distributing centres are equipped with facilities for cold storage.

For the purpose of the Service—use as food for babies—the addition of artificial preservatives has been held to be undesirable. The juice is thus canned without preservative, and since it may later be exposed to conditions likely to encourage their growth, it should therefore contain no micro-organisms. In practice, this condition has not been entirely fulfilled, and fermentation on a serious scale has occurred in Britain. To help in preventing this, the bottlers are permitted to add a little preservative.

There are two points in the distribution chain at which the fermentation becomes especially noticeable.

(*a*) The first is when the cans are unloaded from the ships into the cold stores. In extreme cases the cans burst, and juice drips from the cartons in which they are packed. Alternatively, when the cartons are opened to remove samples for examination, cans may be seen to be blown. Such cans are rejected. The Ministry's inspection may further reveal infection in apparently sound cans, which permits the elimination of yet more unsatisfactory material. Thus fermentation at this stage can to some extent be kept within bounds.

(*b*) The juice, however, may not ferment until later, after it has been bottled. In outbreaks in the distributing centres, it may lead to the loss of a whole batch of bottles; but most troublesome of all is the case when it leads to fermentation and even explosion of the bottles after they have been issued to housewives. Fortunately, such troubles are confined to periods of warm weather (Fig. 1).*

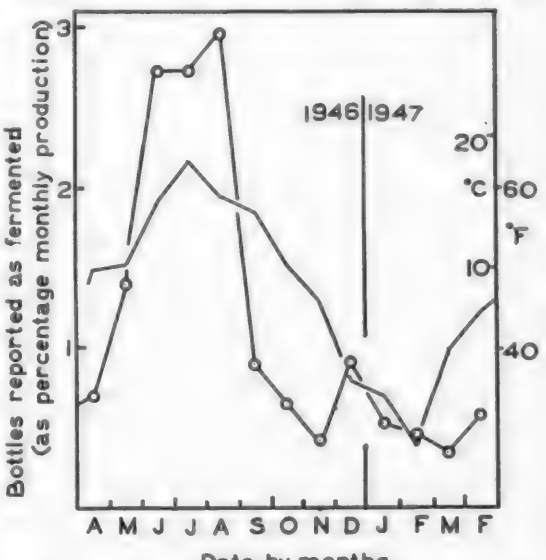
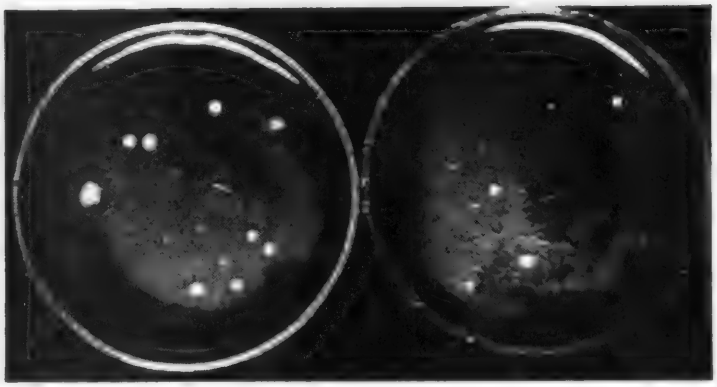


Fig. 1.—The relation between fermentation and warm weather. O———O=orange juice; ———=temperature.

* The record was compiled from statistics reporting each month the number of bottles fermenting in relation to the month of production. Thus, for example, if in May 1,000 are reported fermented from January production, it is assumed that 250 fermented in each of the four intervening months: the figures represented are the monthly totals of these calculated values. This procedure will, in fact, underestimate the fermentation in the hotter months. Temperatures shown in Fig 1 are monthly averages at Kew.



Osmophilic yeasts growing from concentrated orange juice spread on plates of Potato Dextrose Agar.

Close examination before issue of all bottles in the distributing centres has prevented most of this unsound juice from reaching the public.

Cause of the Fermentation

We now believe, from the following evidence, that this fermentation is the work of certain yeasts; probably similar to those which infect honey (Lochhead, A. G., 1942, *Can. J. Res. C.*, **20**, 89).

(*a*) Plating of juice from blown cans always reveals living yeasts in numbers of several millions per ml. On Dextrose Agar or Potato Dextrose Agar (Difco) at 25° C. these yeasts have smooth porcelain-white raised regular colonies. (Plate 1.)

(*b*) Plating of apparently sound cans, in the course of the Ministry inspection, has shown widespread occurrence of micro-organisms in the cans, sometimes in large numbers. Examples of inspections, made at various times, are given in Table I.

The first three represent roughly the worst, and the last two the best, conditions found. When the number of micro-organisms was small, various types were sometimes found, notably red yeasts as well as white, but only the white ones become numerous. Only three types of organism have been observed to occur regularly at this first examination. These are moulds, and red and white yeasts as described. Spores of aerobic bacilli were occasionally found, rarely in considerable numbers.

In pure culture the white yeasts have been proved to be capable of growing in sugar concentrations higher than 65 per cent., and at *p*Hs down to 3; and they readily ferment glucose and fructose, each of which is present in the juices in a concentration of some 20 per cent. They therefore possess characters which should enable them to ferment the concentrated juice.

The red yeasts and the moulds seem to be unimportant, and may be dismissed in a few words. The former possess the characters of *Rhodotorulae*, they have a highly aerobic metabolism, and do not grow well in solutions with as much as 30 per cent. sugar. They die out rapidly at warm temperatures in concentrated juice (Table II).

TABLE II

THE DEATH OF RED YEASTS IN CONCENTRATED JUICE (50° BR.) UNDER WARM CONDITIONS (25° C.).

Days at 25° C.	*Yeasts/ml.*
0	4×10^5
1	$2{\cdot}7 \times 10^5$
2	$1{\cdot}4 \times 10^5$
4	$3{\cdot}2 \times 10^4$
6	$6{\cdot}2 \times 10^3$
10	< 1

The moulds, mostly *Penicillia*, behave similarly; only spores occur in the juice, and vegetative development does not begin unless the juice is diluted to about 40 per cent. total solids. It would hardly be expected, therefore, that these yeasts and moulds would be concerned in the fermentation, and this has never been observed; nevertheless, such organisms should not be present in the cans, as they are evidence of a laxity of practice which could also permit the entry of the fermenting white yeasts.

(*c*) Infection of sterile cans of juice with small numbers of these white yeasts, after their isolation in pure culture, has shown that under warm conditions they can multiply and bring about fermentation, uninoculated cans remaining sound (Table III).

The number of yeasts must seemingly reach about 10^6/ml. before fermentation becomes obvious, so

TABLE I

FREQUENCY AND MAGNITUDE OF YEAST INFECTIONS IN CANS OF U.S. CONCENTRATED ORANGE JUICE AS RECEIVED IN U.K. (CANS TAKEN IN GROUPS OF SIX FROM DIFFERENT PRODUCTION BATCHES.)

Maker.	*Total Cans Examined.*	*No. of Cans with Yeasts/ml.:*					*Av. Infection Yeasts/ml.*
		< 2	2-9	10-99	100-999	> 1,000	
1	396	237	43	62	26	28	> 75
2	360	264	25	12	23	36	> 105
3	134	99	15	1	3	16	> 130
4	265	242	17	2	3	1	> 5
5	196	173	14	6	2	1	> 9

TABLE III

DEVELOPMENT OF OSMOPHILIC YEASTS AND ONSET OF FERMENTATION IN CONCENTRATED ORANGE JUICE (AT 25° C., WITH NO ADDED PRESERVATIVE).

Time at 25° C. (Weeks).	*Sterile.*		*Small Infection.*		*Large Infection.*	
	*Yeasts/ml.**	*Fermentation.†*	*Yeasts/ml.*	*Fermentation.†*	*Yeasts/ml.*	*Fermentation.†*
0	0	0	< 1	0	300	0
3	0	0	< 1	0	$2{\cdot}7\times10^6$	2
6	0	0	35	0	$4{\cdot}9\times10^6$	2
10	0	0	$1{\cdot}3\times10^6$	1	$1{\cdot}1\times10^7$	3
13	0	0	$5{\cdot}5\times10^6$	2	—	—

* Counted after five days' incubation at 25° C. on medium: dextrose 50 per cent. + citric acid 1 per cent. + peptone 1 per cent. + agar 2 per cent.

† Indicated according to the code:

0 = absent.
1 = few bubbles.
2 = vigorous.
3 = subsided.

that apparently sound material may well contain large numbers. The rate of multiplication is such that near the optimum temperature (25° C.) an infection of a few yeasts causes a can to ferment after something like fifty days; in the meantime, the infection is hidden.

(*d*) The fermentation occurring in practice is appreciable only in summer, when temperatures rise above 60° F. (Fig. 2), and it becomes really serious in hot weather with temperatures of 70° F. So far as the canned juice is concerned, it can be prevented almost entirely by keeping in cool stores at about 40° F. as recommended on the labels of the cans. This is, of course, unfortunately not possible after bottling.

The development of the yeasts, which cause the experimentally induced fermentation, shows the same relation to temperature. This is illustrated in Fig. 3: at 5° C. development hardly proceeds at all; it is appreciable at 20° C.; and it becomes about twice as fast again at 25° C.

(*e*) Finally, experiments have shown that if the white osmophilic yeasts are added to bottled sulphited juice, a typical fermentation will be developed if the yeasts overcome the SO_2. Fig 4 gives data from an experiment of this kind.

The above observations leave no doubt that the fermentation is caused by the white osmophilic yeasts. We have rounded off the demonstration by bottling, under strictly aseptic conditions and with 350 p.p.m. SO_2 (the usual preservative), cans of concentrated juice containing such yeasts. In some cases fermentation has resulted when infected samples were used; it never occurred when such yeasts were absent.

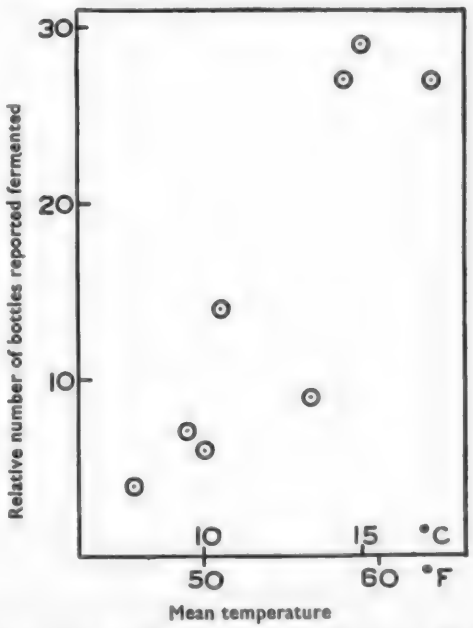


Fig. 2.—The relation between temperature and fermentation in practice.

Sources of Infection

So far we have considered infection only in terms of that brought inside the cans, but although this could account for the fermentation, it is certainly not the only conceivable source of trouble.

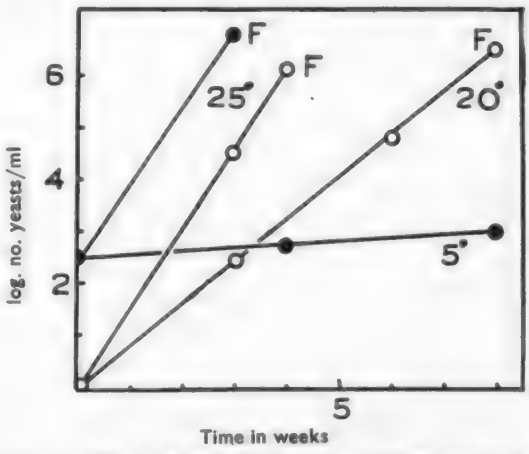


Fig. 3.—The development of infection in two samples of concentrated orange juice at various temperatures (° C.). (F = fermenting.)

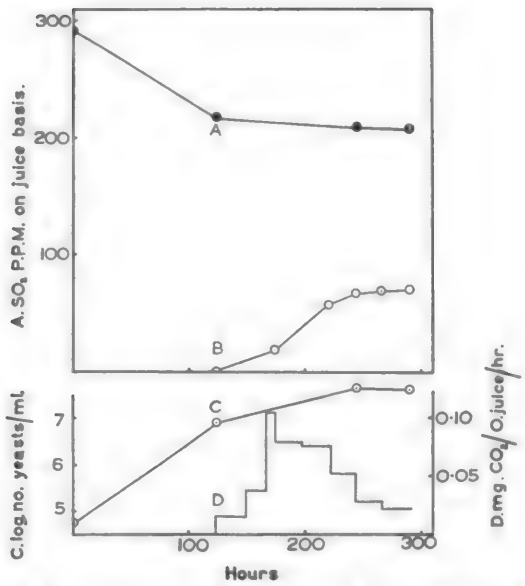


Fig. 4.—Later stages of development of fermentation in sulphited concentrated orange juice. Curve A—total SO_2 in p.p.m. Curve C—log number of viable yeasts/ml. Curve D—output of CO_2 in mg. CO_2/hr./g. juice.

Additional direct infection of the juice may occur at several stages in the processing for bottling.

It must be remembered throughout the discussion which follows that the fermentation is caused by the highly specialised osmophilic yeasts, and that so far as we have seen no other type of organism is able to survive in the concentrate. Thus the generality of organisms admitted by chance contamination, *e.g.* the ubiquitous moulds and sporing bacteria, are unable to do any harm. On the other hand, the dangerous osmophilic yeasts are not widely distributed, being found only in the very special habitats suitable to their growth, and the chance of picking them up casually is, therefore, small in most places; but in dirty sugary materials of composition similar to the juice they are likely to be found in enormous numbers.

Dangers from Dirty Swabs

The dangers of using such things as dirty swabs contaminated with old juice are generally recognised. It should also be unnecessary to mention that articles like wooden scrapers, spoons, stirrers, and tables, are porous and harbour old juice which can scarcely be washed out; immersion in disinfectant sterilises only the surface. What is less generally realised is that traces of juice also stick in such places as porous washers in machines, joints in piping, bearings in taps, and packing glands for pump and stirrer shafts. Such sources of infection can be discovered only with knowledge of local conditions. There are, however, others which apply more generally.

Opening Cans

In the first place, yeasts come in on the outside of the cans (Fig. 5). As a rule, the yeasts are not very numerous, unless the rim of the can has been damaged, when perhaps through leakage of drops of juice there is opportunity for multiplication. Occasions may arise, however, for example when a can has burst and contaminated its neighbours, when the numbers may be very large, and the proportion of osmophilic types high.

Yeasts from the outside of the cans are liable to find their way into the juice unless special steps are taken to prevent this happening. For instance, when the lids of cans are removed to empty them, the can-openers usually work in such a way that the lid may be partly or wholly submerged in the contents. Further, in handling the opened cans, which are quite full, it is not easy to avoid spilling the juice down the sides.

This source of infection could be completely eliminated, if the cans were sterilised on the surface, by washing and treating with warm hypochlorite solution, and then emptied by piercing many holes in the lid with a sterile chisel and upending on a clean rack to drain, but such a procedure would be impracticable with very viscous juices.

Air Contamination

Contamination of the juice from the air is conceivable, but it seems unlikely to be appreciable in quantity. Examination of the air in various factories has shown, even when there was a high

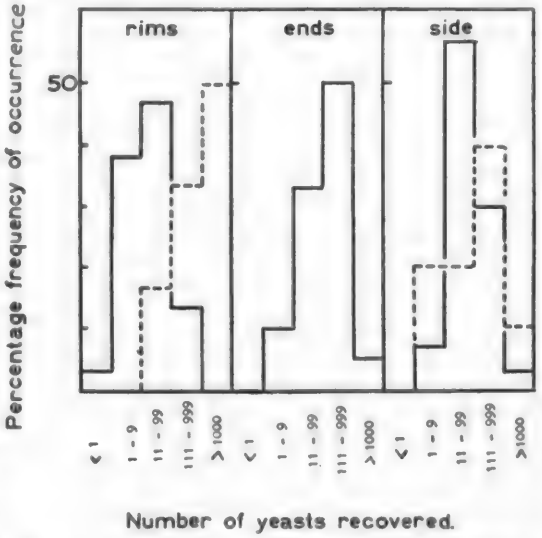


Fig. 5.—The occurrence of yeast infection on the outside of cans of U.S. concentrated orange juice. (—— sound cans, - - - deformed cans.) Yeasts removed by swabbing enumerated by plating on malt agar at 25° C. Fifty examples in each group. (Observations of Miss L. M. Wootton, published by courtesy of Carters, Ltd., Bristol.)

TABLE IV

THE INFECTION OF JUICE FROM THE BOTTLING MACHINES.

Site.	*Infection in Juice just before Bottling.*			*Infection just after Bottling.*		
	Yeasts/ml. on Reaching Machine.		*Proportion Osmophilic Yeasts (Per Cent.).*	*Yeasts/ml.*		*Proportion Osmophilic Yeasts (Per Cent.).*
	Min. Max.	*Av.*		*Min. Max.*	*Av.*	
Factory A, machine 1 ..	0-0	0	—	8-620	200	0
,, 1 ..	0-2	0·3	100	4-230	75	0
,, 2 ..	0-1	0·2	100	10-70	25	45
,, 2 ..	0-2	0·7	100	10-90	35	12
Factory B, machine 1 ..	2-8	5	25	15-1,500	150	80
,, 2 ..	30-40	30	100	25-800	520	100

general atmospheric infection, that there are only occasional osmophilic types, the only commonly occurring yeasts being the innocuous *Rhodotorulae*.

Dangers in Syrup-making

The sweetness of the juice mixture is adjusted by the addition of sugar syrup. This, from the general similarity of its nature to that of the concentrated juice, is particularly likely to cause dangerous infection.

The sugar itself is not usually infected originally, since its manufacture is such as to sterilise it; and although it may become infected by osmophilic organisms as a result of storage under damp conditions, to dissolve it into syrup it is generally heated again to a temperature sufficient to kill all the osmophilic organisms.

The danger chiefly arises from the way in which the prepared syrup may subsequently be handled, especially when it is made in large quantities which are held in storage tanks and pumped to the point at which it is used. Heavy infection can develop in such systems if the equipment is unsuitable and difficult to clean, *e.g.* if tanks are of wood and pump lines of old rubber hose. It has been found that the yeasts usually present, though osmophilic, are not exactly similar to those commonly found in juices, for they have spreading semi-translucent grey colonies. It is possible that they may not ferment orange juice; this remains to be tested.

Dirty Machinery

The principal danger arises from failure to clean equipment properly. The properties of the yeasts themselves make this probably the greatest hazard of all; for whereas they are not common in air, etc., they multiply very well in traces of juice.

Although they are able to grow in concentrated juices up to 70° Br., they grow equally well in dilutions of such juices of 1:50 or more, and a dilution of 1:1 (35° Br.) represents, in fact, about the optimum condition for their growth. Of course, in dilutions appreciably greater than 1:1, a variety of non-osmophilic organisms may grow as well. The obvious danger of contamination by plant, which may not have been thoroughly cleaned of juice which was infected, is therefore much increased; if washing is carried out in such a way that it dilutes rather than removes the concentrate, so that pockets of partly diluted material remain, multiplication of the yeasts in these will be accelerated, and subsequent infection will be more serious. Clearly, the degree of dilution is a matter of circumstance; conditions may sometimes favour the osmophiles, and sometimes more varied non-osmophilic types.

Complexity of Machinery

The possibilities, applicable to all equipment, may be illustrated by reference to the cleaning of the machines used for bottling the juice, since they are necessarily rather complex and consequently hard to clean thoroughly. Bottling machines have proved to be serious sources of infection at times. Table IV gives examples from two factories in which juice nearly sterile before bottling was highly infected immediately it left the bottling machines.

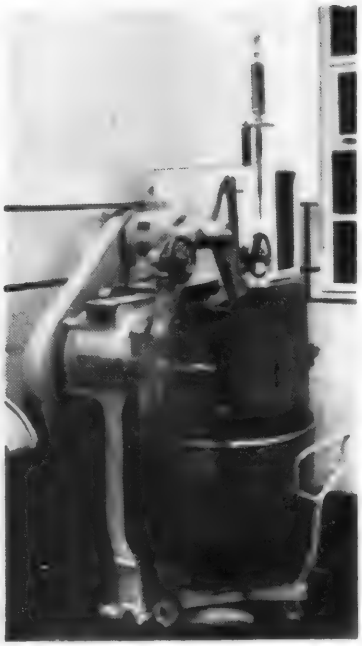
Comparison of Examples

Comparison of the examples in Table IV reveals some of the complexities of such situations. Machine 1 in factory A clearly added wholly non-osmophilic types of yeast such as would only grow in considerably diluted juice; while machine 2 added a minor proportion of osmophiles. This difference between the machines persisted over the few days between our two pairs of observations; but two later examinations at intervals of a few months showed wholly non-osmophilic floras on the first occasion, and a large proportion of osmophilic types on the second. By contrast, the machines of factory B seem to have added an osmophilic infection characteristic of only slightly diluted juice, and it was notable that the washing of these machines was done with much less care than in factory A. It will be evident that the types of yeast which constitute such infections are determined by the chance conditions of the case.

(*To be continued*)

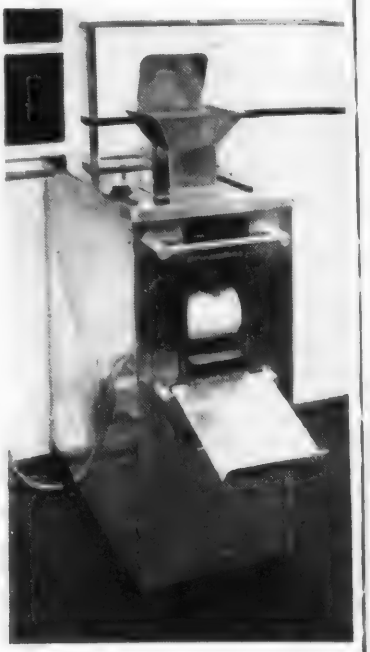
New Test Bakery Opened

A new experimental test bakery, owned by Procea Products, was recently opened at Slough by the company's managing director, Mr. S. A. Lancaster.



A half-sack dough mixer.

Mr. S. A. Lancaster.



The moulder.

Adopting the same principles as those in practice at Irthlingborough, the firm's other test bakery, two-day courses covering every aspect of bread manufacture and including practical and theoretical instruction, are to be held at Slough, with the object of improving the National Loaf. Instructors will demonstrate Procea methods and baking processes.

Bakery Installations

The bakery installations comprise the most modern types of equipment available in Great Britain, including a half-sack dough mixer, a smaller model mixer, a multi-moulder, a prover, manufactured to the company's own design, and a 4 foot by 4 foot oven.

During the official opening a demonstration baking proved the effectiveness of Procea methods.

Half-sack dough mixer on the left and a smaller model mixer on the right.

A batch of test bread is taken from the oven.

FORTHCOMING EVENTS

Hotel and Catering Exhibition

Under the patronage of five important associations connected with the catering industry, a Hotel and Catering Exhibition is to be staged at Manchester City Hall from February 9 to 19. Firms from every branch of the industry will be represented at the Exhibition.

*

Exhibition of Adhesives

An exhibition featuring the raw materials and testing of industrial adhesives will be held by Samuel Jones and Co., at their head office, 16/17, New Bridge Street, London, E.C. 4, from January 31 to February 18, 1949. Prominent in the exhibition will be the wide uses of adhesives for all packaging purposes with special reference to foodstuffs.

*

Dairy Technology Lectures

Designed to provide up-to-date information for persons holding managerial or executive posts in the dairy industry, for dairy laboratory workers, food chemists, Public Health Officers, Public Analysts, and others of professional standing interested in milk, a series of five lectures on "Pasteurisation—the Present Position" has been arranged by the Department of Dairy Technology of the Chelsea Polytechnic.

The series will commence on February 21, at 7.15 p.m., with an inaugural lecture on "Pasteurisation from the Public Health Viewpoint," which will be given by Dr. G. S. Wilson, director of the Public Health Laboratory Service.

The succeeding lectures, which will also be held at the Polytechnic at 7.15 p.m., are as follows:

Feb. 28. "Pasteurising by Plate Type Equipment." J. Matthews, B.Sc.
Mar. 7. "Pasteurising by Gravity Flow Type Equipment." C. Birch.
Mar. 14. "Pasteurising by the 'In-bottle' System." Professor E. L. Crossley.
Mar. 21. "Scientific and Legal Aspects of Pasteurisation in General." T. R. Ashton, M.Sc.

The inaugural lecture will be free, and admission to the remaining lectures will be arranged on payment of 5s. for the course.

British Association of Chemists

The joint meeting of the British Association of Chemists with the Royal Institute of Chemistry and the Association of Scientific Workers which was scheduled to take place on March 31 will now be held on March 30.

*

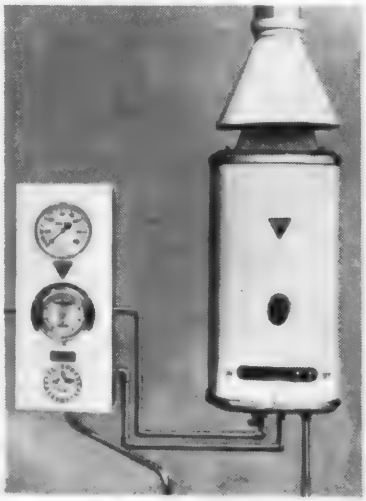
Society of Instrument Technology

The London Section of the Society of Instrument Technology is holding the following meetings at 7 p.m. in the lecture theatre of the Royal Society of Tropical Medicine and Hygiene:

Feb. 21. "Standardisation of Instruments." G. P. Clay.
Mar. 29. "Modern Permanent Magnets for Instruments." D. A. Oliver and D. Hadfield.
Apr. 27. "The Telerecording of Thickness, Pressure, Flow, and other Physical Quantities using a simple Electro-magnetic Circuit." Dr. W. J. Clark.
May 31. "Some Modern Aspects of Hygrometry." Prof. H. S. Gregory and E. Rourke. (To be preceded by the annual general meeting.)

Controlled Hot Water Unit

Of particular interest to bakeries, ice creameries, and other establishments where specific quantities and temperatures of hot water are required, the Ascot controlled hot water unit gives a completely controlled water flow at any desired temperature up to 140° F. The operating principles of the unit enable immediate changes in the hot water temperature to be made without adjustment to thermostats or stand-by burners and constant delivery temperature is provided merely by opening the control tap to a setting predetermined on the index scale. The temperature indicated by the dial thermometer is recorded directly at the outlet spout, thus ensuring accurate and positive measurement of the hot water at the point of delivery. The control unit can be fixed within a maximum distance of 25 feet from the water heating unit, which is supplied with all necessary fittings for installation, and no hot water or solid fuel storage is involved.



A controlled water flow is given by this unit at any desired temperature up to 140° F.

Census of Production, 1949

An Order prescribing the matters about which persons may be required to furnish returns for the Census of Production to be taken in 1949 has been made by the Board of Trade. The Order also exempts undertakings covering the production of coal, gas, electricity, oil shale, crude or refined petroleum, or shale oil products from making Census of Production returns to the extent to which they supply such information to the Minister of Fuel and Power under Section 1 of the Statistics of Trade Act, 1947.

The Order is known as The Census of Production (1949) (Returns and Exempted Persons) Order, 1948.

Plant Engineers' Competition

Members of the Institution of Incorporated Plant Engineers wishing to compete for the Alexander Duckham medal should send their entries to reach the general secretary by February 28. Each competitor should write under a *nom-de-plume* and enclose his name in a separate envelope giving only the pen-name on the cover. Papers for the competition should not normally exceed 3,000 words, and any entry may be published in the journal of the Institution. The winning paper will be read by the author at the annual conference to be held next May at Blackpool.

The salt is raked out of the pans and shovelled into a storage bunker.

Ancient Essex Salt Industry

Since Roman times salt water has been evaporated at Maldon, Essex, and the same simple process is in use today. The sea water is drawn in at high tide, filtered, and boiled in an open pan, where it simmers for twelve hours. Every morning, when the previous day's boiling is cooled, the salt is raked out from the pans pure white and without sediment. The average evaporation per pan is 7 cwt. to 9 cwt. of salt per day, according to the state of the sea water. Maldon salt is almost chemically pure and the analysis yields 99·6 per cent. chloride of sodium. It is used for culinary purposes, and pickling and medicinal cures.

The little industry employs three men; Mr. C. E. Osborne is the present owner of the Maldon Crystal Salt Co., which has been run by one family for nearly forty years.

Food Science Abstracts

The *Index to the Literature of Food Investigation*, published for the Department of Scientific and Industrial Research by H.M. Stationery Office, has been replaced by a new publication, *Food Science Abstracts*, the first issue of which appeared on January 1. This new journal is to be published on the first of every alternate month throughout the year.

Publication of the *Index* has never caught up with the delay and dislocation caused by the war, but it will be completed up to and including Vol. 20 in the course of a year or so. The first volume of the *Abstracts* will therefore be Vol. 21.

Honey Cake from Vegetables

The development of new concentrated food products, derived by the breaking down of vegetables to a powder or flour that is seven or eight times more nourishing than the original vegetable and is also high in sugar content, was demonstrated in Glasgow recently by Dr. Robert Meldau, a German scientist who came to this country at the invitation of the Scottish Council (Development and Industry). The powder can be consumed alone or, mixed with other simple ingredients, made into "honey cake," "fake steak," and other tasty items.

Mould Control in Bakeries

The problem of control of mould in bakeries and similar food factories is a difficult one. When the humidity of the air exceeds 85 per cent. growth of mould is very rapid.

There have been a number of measures recommended but, apart from general cleanliness, the best lies in the use of a special paint. Such a one is "Prevenit," manufactured by the Clariloid Chemical Co.

This is made on a water base, is easy to apply, and is available in snow white or cream. In addition to providing immunity from the ravages of mould and fungus on interior walls, it has maximum light reflection value.

Fittings for Shop and Workshop

Chiefly engaged in the production of precision sheet metal work, Chase Products are prepared to quote either for prototypes or production jobs in any metal, including Staybrite steel. They also produce a variety of standard lines, including metal letters for shop fascias and signs, fluorescent lighting fittings complete with control gear and starter switch wired ready for fitting, metal storage racks, and steel shelving.

Other lines are specialised workshop equipment, including benches, storage racks, and binning made up to specification if desired.

Dr. Meldau demonstrates his invention to Dr. G. Macrae of the Scottish Development Council.

The Blind in Industry

During 1948 the National Institute for the Blind Placement Department, staffed by experts in industrial management, recorded its 1,000th placement of blind men and women in national industry. The Institute, through its expert investigators, has just completed a detailed survey of 5,000 factories; recent additions to the list of jobs available for blind persons include market gardening and dairy farming.

A Working Party was recently appointed by the Minister of Labour to investigate this problem and to go forward with the development of new openings.

A Button Marks the Plaice

In order to study the movements of plaice, dab, and skate, all fish caught alive by the research vessel *Platessa* in an area bounded by the Solway Firth, St. Bees Head, Morecambe Bay, and the Isle of Man are being marked with a numbered black ebonite button and returned to the sea. The Ministry of Agriculture and Fisheries require all recaptured fish to be returned to the collector of statistics at the port of landing to be forwarded to the Fisheries Laboratory, Lowestoft, with the exact position, time and date of capture, and method of fishing.

Self-insulation Building Material

Mixed with cement in place of sand or gravel to produce a lightweight construction material furnishing its own insulation, vermiculite, a material of the mica family, can be expanded from nine to sixteen times its original size and weighs only from 7 lb. to 10 lb. per cubic foot. Used in bricks, floors, blocks, and walls, vermiculite concretes give nearly ten times as much insulation as does the same amount of sand-and-gravel concrete. Loose vermiculite is used as an insulating material which has the additional quality of being verminproof, while vermiculite plasters are fire and soundproof and resist all moisture.

Its uses are not confined to construction work; although not a fertiliser, this mineral is currently being used to aid plant growth, and has already been utilised for the slow cooling of steel.

Research Director's Retirement

In view of the outstanding work which has been done at East Malling under his inspiration and leadership during the past thirty-one years, the news of the retirement of Dr. R. G. Hatton, C.B.E., M.A., D.Sc., V.M.H., F.R.S., from the directorship of East Malling Research Station will be received with the greatest regret by all associated with fruit growing. Not only has Dr. Hatton's particular research, notably that on fruit tree rootstocks, been of the first order, but, in addition, he has throughout been the guide, genius, and friend of his growing staff in their work on many and diverse problems.

When the present Commonwealth Bureau of Horticulture and Plantation Crops was established in 1929 as the Imperial Bureau of Fruit Production, it was at East Malling under Hatton as director. The Bureau has profited immensely by his advice both as director and latterly as consultant director.

He was appointed to many outside bodies, including the Council of the Royal Horticultural Society, the Governing Body of Wye College, The National Fruit Trials, and the Agricultural Science Committee of the Royal Society. In 1936 he became Doctor of Science in London University. Honours received include the C.B.E., Fellowship of the Royal Society, and the Victoria Medal of Honour of the Royal Horticultural Society.

It is hoped that his retirement from the post of director of East Malling will not mean his severance either from the Research Station or from the world of horticulture generally.

Infra-red Plant Seals Whisky Bottles

An infra-red plant for drying "Viskring" bottle seals on their products has recently been installed by W. and A. Gilbey, Ltd. These seals were put on wet over the bottle neck after corking and in normal ambient temperature took several hours to dry and shrink.

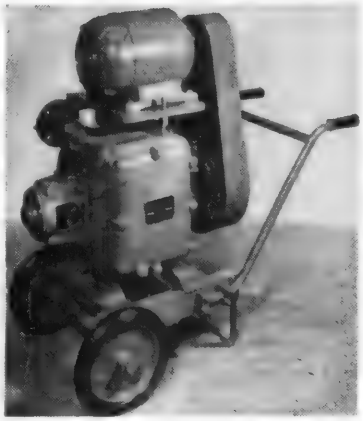
The new plant, supplied by Metropolitan-Vickers Electrical Co., Ltd., uses forty-eight lamps with a total loading of 12 kW and handles 130 dozen bottles an hour, enabling them to be filled, corked, and sealed on the same conveyor which takes them through to the packing department.

Another type of plant available for use where floor space is restricted takes the form of a turntable driven by a suitably geared motor. These plants can be used for a similar purpose by mineral water manufacturers, manufacturing chemists, and other industries where seals are used on bottle necks. In addition the plants can be used for the drying of bottle labels at the same time as the seals are dried.

Census of Distribution

The Census of Distribution Advisory Committee, appointed by the President of the Board of Trade in July last, has been considering the forms to be used in the first national Census of Distribution and Other Services planned for 1950 in respect of the year 1949. However, although the forms had already been decided upon and were ready for distribution to traders, Mr. Wilson, President of the Board of Trade, recently announced in the House of Commons that the Government had decided to postpone the census for one year.

In his statement Mr. Wilson said that from communications received from hon. members on both sides of the House and from many trade organisations it was clear that many of those engaged in the distributive trades had not become sufficiently acquainted either with the form that the census would take or with their responsibilities in completing the census forms. Many traders had not realised that they might, if more convenient, make a return for their financial year rather than the calendar year 1949.



Versatile Liquid Pumps

A pump which can handle a variety of liquids and possesses positive self-priming and constant discharge volume under varying conditions can be put to many purposes and, if easily portable, eliminates non-productive time.

The standard pump made by Megator Pumps and Compressors, Ltd., and which fills these requirements is arranged for V-belt drive on a hinged base plate, in capacities from 250 to 6,000 g.p.h.

W. J. Bush Entertain

Members of the Dramatic Section of the Sports Club of W. J. Bush and Co., Ltd., were responsible for providing an entertaining evening on December 23, when they gave an excellent performance of "The Body was Well Nourished" by Sidney Gilliat and Frank Launder at the Cripplegate Theatre, London. The show was preceded by cocktails and dinner at the Abercorn Rooms, Great Eastern Hotel, Bishopsgate.

Among an all-round first-rate cast, Eric Bush must be singled out for his clever portrayal of the vacuum salesman who finds himself unwittingly the centre of a political intrigue with the inevitable complement of a "body" and foreign agent without whose presence no play of this nature would be complete. Special praise should also be accorded to Patricia Julian, Percy Dawney, and Alan Brinsley for stepping into the breach caused by illness.

Conditions of Practice for Designers

It is the purpose of the Society of Industrial Artists, the representative professional body of designers in Great Britain engaged in industry and commerce, to raise the standard of design by establishing satisfactory conditions of practice, and by the adherence of its members to a common code of professional conduct.

To this end the Society has published the following leaflets:

Code of Professional Conduct.
Conditions of Contract for Industrial Design Consultants.
Conditions of Contract for Commercial Design.
Schedule of Average Fees for Commercial Design.
Schedule of Average Fees and Salaries for Textile Design.
Schedule of Average Fees for Exhibition Design.
Regulations governing the conduct of Open Competitions in Commercial and Industrial Design.
Aims, Organisation, and Conditions of Membership of the S.I.A.

Spiral Flotation Drier

Specially designed to meet the requirements of farm crop drying and the production of cattle feedingstuffs from vegetable matter, the spiral flotation drier produced by Bamag, Ltd., operates on the pneumatic principle, which means that the material is airborne in a stream of hot gas during the drying process. This is achieved in such a way that the material is subjected to a primary drying at a very high temperature, followed by a secondary drying at a moderate temperature. This two-stage drying, in a single chamber, produces a uniformly dry and consistent product in the minimum drying time and without overheating the material. The drier will operate successfully on a very wide range of materials; apart from its agricultural applications, it can be used for drying kitchen and cannery waste, sewage sludge for the preparation of fertilisers, and industrial residues of all kinds.

Cooling Chocolate after Enrobing

Scottish refrigeration engineers have recently been called upon to extend their activities to the chocolate manufacturing industry, and a considerable field of development is visualised in this direction. One problem with which they were faced was how to prevent hot chocolate sticking to the conveyor belt after enrobing. This was solved by the supply of a forced air cooling installation which cooled the temperature of the chocolate to a point where sticking did not take place.

Refrigeration processes have also been successfully adopted for the final cooling of moulded chocolate.

Chemicals Directory

Providing up-to-date information of the manufacturers of all types of chemicals, the latest edition of the directory *British Chemicals and their Manufacturers*, published by the Association of British Chemical Manufacturers, also incorporates a classified list of British chemicals, of indicators and microscopic stains, of proprietary and trade names, and of proprietary and trade marks.

New Pedestrian Controlled Electric Vehicle

Suitable for the selling of ice cream and light refreshments, the latest Graiseley pedestrian controlled electric vehicle combines the best features in coachwork of decorative design and craftsmanship. The whole of the interior of the vehicle, which is produced by Diamond Motors, Ltd., is lined with plastic and aluminium panels, and is attractively illuminated. Considerable interior space is available, incorporating a continuous counter, and spacious shelving on either side, while the bottom decks accommodate cleaning requisites, utensils, and gas cylinder. The rear entrance door is fitted with a large glass panel which can be lowered at will, and the sliding side windows are made of toughened glass.

Wall's Chairman Reports on U.S. Tour

Describing his six weeks' study of marketing methods in the United States, Mr. Cecil W. Rodd, chairman of T. Wall and Son, Ltd., said that although U.S. ice cream plants were very modern, Americans could still learn a great deal from Britain in this respect. Despite the fact that American ice cream could be made entirely from dairy products, good British ice cream compared very favourably with it.

On the subject of bacon, Mr. Rodd said that American taste was entirely for streaky bacon. In the packing plant, after curing, the belly of the pig was put in a hydraulic press and then sliced for uniformity of shape and size. It was then despatched to the factory in slices.

Obituary

We regret to record the death of Mr. H. C. Appleby, M.Inst.F., A.M.I.Mech.E., a valued contributor to FOOD MANUFACTURE and the author of the Boiler House Section of FOOD INDUSTRIES MANUAL.

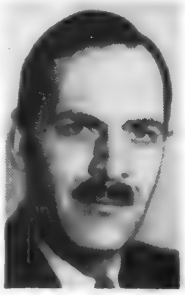
An engineer by profession, Mr. Appleby's activities were mainly concerned with fuel economy and during the late war he did excellent work in this direction.

Appointments

The recent election of Mr. H. Copping, M.I.E.E., as chairman of the Utilisation Group of the North Midland Centre of the Institution of Electrical Engineers coincided with the twenty-first anniversary of his joining the Institution as a student member. Mr. Copping is a member of the Association of Mining Electrical and Mechanical Engineers and also of the Executive Committee of the Leeds branch of the Incorporated Sales Managers' Association. He has been associated for many years with George Ellison, Ltd., and was manager of their Glasgow office from the date of its opening until 1938, when he was appointed manager of the company's Leeds office.

*

Brigadier W. B. Sallitt, O.B.E., B.A., A.M.I.Mech.E., has been appointed managing director of The Spooner Food Machinery Co., Ltd., and a director of The Spooner Dryer and Engineering Co., Ltd.



Since the war he has been deputy manager at the Bradford works of the English Electric Co., Ltd.

*

Mr. H. M. Dick, manager of the transport and motor trade departments of the Scottish Wholesale Co-operative Society, Ltd., has been elected chairman of the Glasgow branch of the Industrial Transport Association.

South African Visit

Mr. J. Arthur Reavell, chairman of Kestner Evaporator and Engineering Co., Ltd., is spending three months in South Africa visiting a number of works where Kestner plant is in operation. He is also examining the prospect of extending business and of manufacturing in the Union.

Railway Containers for Frozen Foods

The British Railways' constructional programme, which will provide a total stock of over eighty highly insulated containers for the transport of frozen foods, is now practically completed. Each container has a loading capacity of $2\frac{1}{2}$ tons to 3 tons, the insulation being 9 in. thick and embracing the whole of the container. The door has been constructed to give a perfect seal. A special openwork grid on the floor allows the cold air produced by the solid CO_2 to circulate freely under the load, and metal lining of the walls, roof, and floor enhances the cleanliness and conductivity of the unit.

Plans are being formulated for additional construction of this type of container so that the increasing demands from traders may be met.

British Industries Fair, 1949

A series of memos. will be issued by the press office of the Board of Trade before the opening of the British Industries Fair in London and Birmingham on May 2.

The new address of the organising offices of the B.I.F. in London is: Commercial Relations and Export Department, Board of Trade, Horseferry House, Thorney Street, London, S.W. 1. The Fair is organised by this department in close co-operation with the Chamber of Commerce, Birmingham. The director of the Fair in London is Mr. R. E. J. Moore. The address of the organising offices of the B.I.F. in Birmingham is: Birmingham Chamber of Commerce Incorporated, 95, New Street, Birmingham, 2.

The B.I.F. Publicity Section is now in a position to give details of progress in the preparation of the Fair, arrangements made to publicise the Fair overseas, and preliminary details of exhibitors and some exhibits.

Calendar for 1949

A calendar for 1949 is being issued by T. Harrison and Co., Ltd., of Burnley House, Willesden, London, N.W. 10, who inform us that they will be pleased to send a copy free of charge to readers of FOOD MANUFACTURE upon application.

Jute as Packaging Material

ITS CULTURE AND PROCESSING

An interesting paper on the uses of jute as a packaging material was read by Mr. W. G. Atkins at a recent meeting of the members of the Institute of Packaging.

Stressing the fact that it was useful for the packaging executive to know something about the growing, harvesting, and processing of jute fibre as well as its constitution and properties, Mr. Atkins stated that the first occasion on which fibre was exported from India was about 1795. A report covering its growth and probable commercial value was then made to the directors of the East India Co., but it was not until 1832 that successful experiments were carried out on scientific lines, and from that year jute was regularly spun in Dundee.

Mr. Atkins then described the two species of the jute plant and gave an account of its culture.

With regard to the manufacture of jute fabrics, he said that this was capable of division into six principal stages—batching, preparing, spinning, winding, weaving, and finishing.

Mr. Atkins' lecture provoked many queries from members, especially with reference to the system of marking employed in the industry, and whether there is in hessian anything that causes metal parts to corrode when it comes in contact with preservatives on the metal. To the first question Mr. Atkins replied that the system of marking is made on an entirely visual basis, and that he did not feel that it would be possible to obtain a practicable scientific assessment. As to the second question, he suggested that the wrong source was being blamed, and that the real trouble was the condensation of the atmosphere on the metal strip.

Food Containers

Made from high purity aluminium alloy for all forms of handling and processing of foods and liquids, Warwick containers are based on one of a wide range of standard shapes, adapted and finished to suit the needs of the user. Typical of such vessels are milk pails, fish transport boxes, bushel fruit boxes, apple juice containers, and a wide range of trays for handling and processing food.

The company also produces a wide range of standard hotel ware such as boiling pots, mixing bowls, and porringers particularly designed for heavy duty. Café tables and chairs specially designed for hard use in restaurants and canteens are also available.

New Sales Offices

The main sales office of the Mastabar Belt Fastener Co., Ltd., is now located at Marfleet, Hull. The main home and export sales offices of Henry F. Cockhill and Sons, Ltd., are also at Marfleet, but a completely equipped sales department is remaining in operation at Mount View Works, Cleckheaton.

Sieving and Grading Machinery

Suitable for screening all types of materials, wet or dry, the sieving and grading machines manufactured by S. N. Bridges and Co. work on the principle of direct vibration and can be used for every job of sieving, sorting, and grading. A feature of these machines is the manner in which the sieving trays can be arranged. Several sieves can be placed one above the other, enabling grading in various sizes to be effected automatically in one operation. The machines can also be arranged for continuous operation by the use of hopper or chute feeds.

All models (with the exception of the "Baby") now incorporate a gear box which gives a wide range of speeds and makes them adaptable for every purpose.

The company are able to quote delivery of any of their machines within twenty-one days.

Soap Specialists

Pioneers of liquid toilet soaps, which they have supplied since 1911, the Horton Manufacturing Co. manufacture a wide range of products of interest to all industries in which strict standards of cleanliness have to be observed, and have developed systems of special soap distribution suitable for factories and offices of all sizes. These extend from individual tilting containers to a plunger-operated service embracing all the washbasins in a building.

Their range of soap substitutes includes cleansing powder for floors, paintwork, food vessels, and utensils, a selection of high-power detergents available for heavy degreasing jobs and scouring, as well as a liquid surgical soap for personal use. Other aids to hygienic working conditions produced by the company include disinfectants, insecticides, and barrier creams for wet and dry processes.

Booklets Received

Only by employing systems of remote indication and control can waste of material and man-hours in large plants be avoided, and a new booklet, produced by Evershed and Vignoles, gives some idea of the scope and amount of work undertaken by the company's controls department in the many fields of industrial activity.

*

Produced specially for export distribution, a well-illustrated brochure compiled by George Cohen, Sons and Co., Ltd., gives a synopsis of the manufactures of the "600" Group of Companies. The trading activities covered are the supply of modern reconditioned, second-hand, and new plant and machinery, and the supply of raw materials, chiefly to the metallurgical and allied industries. A kindred publication, in condensed form, is being prepared in French and Spanish.

*

Modern research has proved conclusively that the use of planned colouring has far-reaching physical and psychological effects on the working efficiency of factory operatives. In a small booklet produced by Arthur Holden and Sons, Ltd., some ideas for factory decoration are introduced. Notes on accident prevention, artificial lighting, and factory and machinery painting are included, as well as a brief description of some of the benefits to be derived from simple colour schemes, some of which are outlined.

*

To illustrate the range of standard interchangeable chemical plant units now available to the chemical engineer, Quickfit and Quartz, Ltd., have issued a comprehensive catalogue on industrial plant in glass. Drawings and tables of dimensions referring to these units are set out for the benefit of technical and design personnel, and the latter half of the catalogue shows methods of erection and schematic drawings of typical assemblies. On practically every plant assembly certain special parts are necessary and modification of standard units may be required; a "specials" production department has been set up to meet these requirements.

OBITER DICTA

● I am humbly thankful that I married a wife who is a good cook.—*Mr. Norman Smith, M.P.*

● Does the hon. lady (Dr. Edith Summerskill) find any subversive activities on the part of red hens?—*Mr. Gallacher, M. P.*

● I do not think it is such a bad thing for a young soldier to peel potatoes now and again.—*Field-Marshal Lord Wilson.*

● Even the present Parliament has not yet devised a means of controlling the output of the cow.—*Mr. P. D. Clarke at Cirencester Magistrates' Court.*

● It is said that in a discussion between two countrymen on modern education, one of them complained that his boy was being taught to spell "taters" with a "P."—"*Milling.*"

● I hear that a worried Socialist election agent has said that if the Government interfere with drink it will be "Ale and Farewell."—*Peterborough in the "Daily Telegraph."*

● Someone has called Mr. Strachey the "Wizard of One Oz." They hoped to be able to call him : : The Wizard of Two Oz. or Three Oz."—*Professor J. A. Scott Watson on the bacon ration.*

● If we adopted the American motto of "Eat all you can and can what you can't" we should get on a lot better.—*Mr. H. G. Polley at a meeting of the Kent and Essex Sea Fisheries Committee.*

● I never saw such domesticated chickens in my life. They jumped on Mrs. Strachey's arm to be petted. They are great layers.—*Mr. Gardiner, Canadian Minister of Agriculture, on his visit to Mr. Strachey's home.*

● It is no good talking about the masses. Everybody today is the masses. There is too much talk about the masses suffering. I get exactly the same rations as everybody else. If people want to spend their money upon food instead of clothing, it is their pigeon.—*Mr. C. E. Fox, chairman of the Sevenoaks Rural Food Committee.*

Company News

During the year under review the subsidiary companies of Allied Bakeries, Ltd., had continued their policy of expansion and development and had once again increased both turnover and profits, it was announced at the thirteenth annual general meeting held recently. Despite the tendency to rising costs throughout the year, the net profit of the company showed an increase of just under 40 per cent. as compared with the previous year. Dividends were maintained at the same level as before, *i.e.* 5½ per cent. on the preference shares and a total of 20 per cent. on the ordinary shares.

●

In their tenth annual report the directors of Weston Foods, Ltd., state that dividends have been maintained at 6 per cent. on the preference shares and a total of 30 per cent. on the ordinary shares in accordance with the Government's policy of limitation of dividends. The holding company, Allied Bakeries, Ltd., had undertaken to bear the profits tax liability of the group in consideration of a management charge.

■

Conditions in the biscuit trade during the year, as far as raw materials were concerned, had shown no improvement, it was stated by the chairman and managing director, Mr. William P. Webster, when he presided over the twelfth ordinary general meeting of Wright's Biscuits, Ltd., recently. The main ingredients were still controlled and in short supply, and until some increase was made, the inability of the grocery trade to supply public demands would remain acute. In addition, the trade had been called upon since 1939 to supply demands from entirely new directions.

The financial position for the current year had so far been satisfactory. After providing for the preference dividends and the interim dividend there remained a balance from which the directors proposed to pay a final dividend of 1s. 3d. per share. During the year a profit was made upon the realisation of investments and this was transferred to a reserve account. From this reserve a distribution of 7 per cent., which would not be subject to income tax, on the ordinary shares, was proposed.

News from Overseas

New Turkish Sugar Mill

A new sugar mill, with a capacity of 15,000 metric tons, is to be built at Diyarbakir, Turkey, for the processing of sugar beet.

The country's four state-owned sugar factories have been unable for some time past to meet domestic demand, as consumption has expanded considerably in recent years.

Bizonal Food Developments

Two new and popular food products have been developed and manufactured in the Bizone to help ease the shortage of meat and dairy products.

One meat company has succeeded in developing a 100 per cent. ersatz sausage which is currently being produced in two Hanover plants.

The second food product, a milk substitute known as "Maltavena" or "Lactavona," was developed by members of a British medical research group working in the Ruhr, and is now being manufactured by a Hamburg firm at the rate of 100 tons a month. The mixture, composed of skim milk powder, soya, barley, corn, wheat, sugar, and vitamins, contains all the minerals and vitamins found in milk, and has been fed on an experimental basis to selected groups of children throughout the Bizonal area for over two years with excellent results.

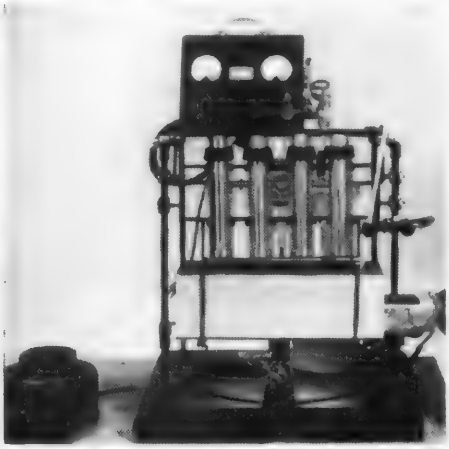
Packaging Glossary

Industrial progress is facilitated when basic terms used by a particular group in describing materials, processes, and machinery have been standardised, and, in an attempt to fulfil this need for the packaging industry, the Packaging Institute, Inc., of New York have published a list of standard definitions of trade terms customarily used in the packaging field. Entitled a *Glossary of Packaging Terms*, this volume is composed of a general section and separate sections on adhesives, containers of all kinds, carloading terms, closures, flexible packaging materials, interior packaging methods, labels, and packaging machinery. Sections on wooden boxes, plastics, and other packaging items will be included later. The Glossary, which assembles the work of many trade associations, companies, and individuals, will be kept up-to-date by the issue of annual editions.

Separation of Vitamin E from Oils

Molecular distillation for semi-micro analyses may be carried out on several samples simultaneously in a still now being manufactured in the U.S.A. Operating under high vacuum to pressures as low as 1×10^{-5} mm. of mercury, the stills are used to separate heat-sensitive substances of high molecular weight. Samples are loaded into each still unit and are then immersed into an oil bath held at distilling temperature by electrical heaters which are controlled through a resistor. The distillate collects on the condenser, which is removed to obtain the fraction after each distillation. Samples may range from a few milligrams to a gram in each still unit.

This analytical still, which has been produced by Distillation Products, Inc., was made for the separation of vitamin E from oils extracted from foods and other biological materials.



Analytical still for the separation of vitamin E from oils.

New Exchange Regulations

Under the new import regulations in South Africa, referring to both sterling and non-sterling countries, the following goods may not be imported unless an import permit is granted:

Aerated mineral waters; ale, beer, cider, and perry, all strengths exceeding 3 per cent. proof spirit; baking powder; beverages; bird seed; biscuits, cakes, puddings, and pastry; chocolate, slab (plain, milk, nut, or fruit); cocoa; coffee, roasted or ground; cottonseed oil; dog biscuits; eggs; fish (except sardines), fish pastes (potted or tinned), caviare, lax, lobster; fruit, excluding dates; hides and skins; jams, jellies, and jelly powders; liqueurs, cordials, and mixed potable spirits exceeding 3 per cent. proof spirit; macaroni and spaghetti; maize; meat soups, excluding beef soups; nuts, edible; oats, rolled, ground, or bulk; onions and garlic, not preserved; peas, beans, and lentils; pickles, sauces, chutneys; soap, soap powders and extracts; soya bean oil, refined, edible; soup, concentrated; starch other than dextrinised starch; syrup, maple; treacle; vegetables; vinegar (not vinegar essence); yeast.

U.S.-Greek Agreement

The Agreement signed in Athens on May 5, 1948, between the Governments of the U.S.A. and Greece and the Agricultural Bank of Greece, concerning food processing, refrigeration and stores, has been ratified by law.

In accordance with the terms of this Agreement, the U.S. Government, through the American Mission for Aid to Greece, agrees to provide an amount of not more than 4,800,000 dollars, to be utilised in the rehabilitation and development of the facilities for processing, storage, and refrigeration of fish and agricultural products, and in the expansion of the fishing industry.

The amount of 4,800,000 dollars may be used by the Mission for the purchase of equipment and materials from abroad, to be sold to users in Greece by the Agricultural Bank of Greece; alternatively, dollars may be made available to borrowers from the Agricultural Bank of Greece for the purchase of equipment, materials, supplies, and services from abroad.

Removal of Export Controls

In order to encourage export trade to the maximum extent permitted by the supply position, the Eire Minister for Industry and Commerce has made an order, which came into effect on January 1, freeing canned fruits and jams from export control.

No Kangaroo Meat for Britain

The Brisbane Chamber of Commerce recently received a letter from a firm in Britain asking if it would be possible for kangaroo carcasses to be boned in Australia and the meat exported in bulk. The Chamber has replied expressing the opinion that such a scheme would be impracticable; most kangaroos are in distant parts of the State and one of the major obstacles to such a scheme would be the transport of the meat to the coast.

Although to some, kangaroo tail soup is a delicacy, little kangaroo meat is eaten in Australia.

Laboratory Planned by Technology Institute

A new laboratory building for biology and food technology is among the projects proposed in a 20,000,000 dollar development programme for the Massachusetts Institute of Technology. Half of this amount is required for endowment and unrestricted funds; the balance will be used for new facilities and equipment at the Institute.

The laboratory will house, in a single building, the Institute's work in biology, nutritional biochemistry, and food technology. Plans for the building, which is estimated to cost 2,000,000 dollars, call for a flexible space layout through the widespread use of temporary partitions, so that changes may be made easily and quickly for adjustment to new conditions.

It is anticipated that the laboratory will become a major centre of biological research where problems in the field can be attacked by modern scientific methods.

The construction programme also includes a gymnasium-auditorium, faculty club, and new laboratories for nuclear science and engineering, metals processing, hydrodynamics, and electronics.

New Fungicide

The development of a new chemical that kills the fungi responsible for extensive food losses is reported in the United States. The chemical, a product called echridine, is synthesised from pyridine compounds, which are recovered from the coke oven gases of steel mills, and it is said to have proved effective against fungi in laboratory tests even when diluted to a strength of one part in 150,000.

Introducing the Silver Herring

Herring served straight from the barrel were the attraction at a dinner recently held at the Bristol Hotel in Oslo. The herring had been packed by a new method, which consists mainly of the use of a 15 per cent. salt brine with the admixture of a small quantity of vinegar. The fresh herring are placed direct into large cement tanks containing the patent brine. After five to six days, the scales fall off and the herring are put into barrels in the same brine and can remain there for several months without becoming rancid. The herring, packed after the head and entrails have been removed, can be served direct from the barrel without desalting. Fish treated by this process are particularly tasty and keep fresh in various temperatures for any length of time. They maintain their nutritional value and also their original look—hence their name of Silver Herring.

Foreign buyers have shown great interest in the new method, and, for the time being, Silver Herring are for export only. The brine, on which research began six years ago, can also be used for packing other fish such as mackerel, and also whale meat.

Synthetic Sweetening

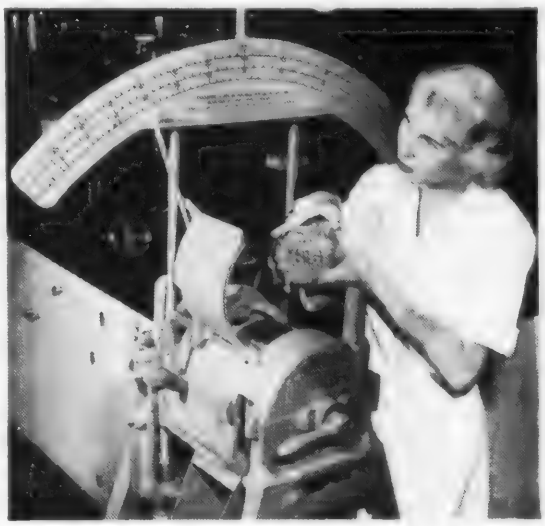
A substance whose sweetening capacity is said to be about 1,000 times that of sugar is reported to have been developed at a chemical factory in Baden, South Germany. Called "Douxan," this substance can be used for cooking purposes and does not turn bitter. It has slight fermentation-retarding properties and thus a conserving effect.

International Trade Fair

The Canadian Government Exhibition Commission has announced that the International Trade Fair which they organised in 1948 achieved a degree of success which justifies its establishment as a regular event. It will accordingly be held again from May 30 to June 10, 1949.

Conditions of participation will be broadly the same as before. Full details are obtainable from the Canadian Government Exhibition Commission's representative in London, Miss M. A. Armstrong, Canada House, Trafalgar Square, S.W. 1. Telephone: Whitehall 8701.

The Fair is open exclusively to trade buyers for most of its run, although the public will be admitted on three days in 1949 as against only one in 1948.



For testing tenderness, a handful of peas is dropped through a small door of the Tenderometer into a cylinder. As soon as the door closes the machinery is set in motion. Knife-like blades cut through the peas and at the same time the force to do so is measured and indicated in pounds on the elongated dial.

Food Canning Factory for South Africa

One of the largest factory buildings in Port Elizabeth, hitherto used by the Ford Motor Co. of South Africa as an assembly plant, has now been converted into a food canning factory by a large South African canning combine.

The new plant will be largely concerned with the canning of fruit and the manufacture of jam. It will also be engaged in the preparation of fruit juices for export.

Eire's Creameries Face Losses

As Irish butter production is not as high now as had been expected and it is feared that the quantity now being cold stored might not be adequate for the winter if cheese production were not checked, Eire's Minister of Agriculture has requested that cheese manufacture be temporarily suspended.

Co-operative creameries are stated to be very perturbed by this request as they had entered into contracts with farmers to pay 2½d. per gal. for skim milk in addition to the fixed price per gal. for whole milk. They are afraid that, should the Minister follow up his advice by an order to prohibit the manufacture of cheese, no alternative use could be found for skim or separated milk and the creameries would be faced with a serious loss.

The suggestion that the creameries should confine their activities to the manufacture of butter has been received with surprise, because other branches of the industry, apart from cheese, are far from profitable in Eire. The opening up in Eire, for instance, of certain industries that use whole milk as the basis of their raw material is providing creameries with a ready and profitable means of disposing of considerable quantities of their supplies. The creameries state that the manufacture of butter only at the present price would mean disaster for them.

At a meeting of Limerick Co. Committee of Agriculture it was stated that the Minister's action was taken because there was no market for bulk cheese, but that the production of processed cheese would not be affected.

Oil-bearing Seeds in South Africa

Returning from a six months' visit to England, Mr. A. D. Gourley, chairman of Lever Brothers in South Africa, stressed the importance of an increase in South Africa's production of oil-bearing seeds. Although local production had increased in two years from 10,000 tons a year to more than 70,000 tons, it was important that production should be increased still further as the world shortage would last a long time.

South Africa is still largely dependent on imported oil-bearing seeds, which come from the Rhodesias, the Belgian Congo, and Portuguese East Africa. There are several oil expressing plants in the Union, situated mainly at the coastal ports and inland in the Transvaal.

Slot-machine Coffee

A fully automatic coffee vending machine which can produce a fresh cup of coffee, steaming hot, every five seconds, has been developed in Pennsylvania. The "Kwik-Kafe," as it is called, can supply 425 cups without refilling, and even produces a spoon with each sanitary paper cup.

The machine operates on AC current which can be converted if necessary to DC. It has an attractive cream and brown finish, and the only charge for service is the 5 cents put in the slot for each cup of coffee.

U.S. Rice Treating Process

A new rice processing technique, called "malekising," whereby, it is claimed, 85 per cent. of the vitamin content of the rice is kept intact in the polished rice grain, has been developed by a U.S. firm, and is now ready for commercial development.

The Malek process is a method of parboiling and steaming unpolished rice so that almost all of the nutritional value in the bran is forced into the core of the rice grain. The process also serves to seal the pores of the rice kernel through gelatinisation, so that the valuable vitamins and minerals are literally locked in the kernel after the rice has been polished.

This gelatinisation process prevents the rice from becoming sticky and gummy when cooked. Tests under a variety of conditions have revealed that rice which has been malekised has each grain separate and intact, and is of a fluffy consistency.

Interchangeable Microscopes

Consisting of fifteen basic models that can be interchanged into fifty-eight different combinations for medical research, industrial, and educational purposes, a new series of wide-field microscopes with dust-proof optical systems has been produced in the U.S.A.

Dissecting microscopes are available with an extra large stage and base, while with an elaborate instrument for use in surface examination, a circular area of 5 feet in diameter may be inspected.

All eyepieces and objectives are of new design. The objectives minimise image deterioration at the edge of the field of view, while the eyepieces provide a higher eye point for greater comfort, and prevent interference with glasses, should the user wear spectacles. A dust-proof, sliding nosepiece on three-objective models offers a rapid, convenient means of interchanging objectives, and ensures viewing the subject with only one objective at a time.

Four positions are provided for a new illuminator and fluorescent lamp, to enable the microscopist to arrange his lighting. The microscopes are equipped with diffusing discs of black and white that provide background contrast.

News from the Ministries

Food from Canada

Recent negotiations between the United Kingdom and Canada ended on December 7 in agreement by the United Kingdom Government to purchase in 1949, subject in the case of bacon and cheese to the approval of E.C.A., and by the Canadian Government to supply, the following quantities of Canadian livestock products:

Bacon	..	160,000,000 lb.
Cheese	..	50,000,000 lb.
Eggs	..	1,533,000 cases of shell eggs or the equivalent in the form of dried whole egg or frozen whole egg.

Prices agreed for the first two commodities are the same as those stipulated in the 1948 agreement. In the case of eggs, the prices are slightly lower.

Marketing Arrangements for Ware Potatoes

The Potatoes (1948 Crop) (No. 2) Order, 1948, has been amended as from December 15, 1948, so as to lift all restrictions on the marketing of grade A potatoes and, in Scotland, Northumberland, Durham, Lancashire, and Cheshire, of certain varieties of grade B potatoes. These restrictions, which were imposed on October 1, have been lifted earlier than in 1947 because grade A potatoes are not keeping well and because the restrictions on the marketing of some of the grade B varieties in the areas listed above have now served their purpose.

The marketing restrictions remain in force on the following varieties which may not be sold except under licence or to the Ministry: Arran Consul, Arran Peak, Dunbar Standard, and Majestic grown in Bedfordshire, Essex, and Suffolk, or on limestone, silt, warp, red, or skirtland soils in Cambridgeshire (including the Isle of Ely), Derbyshire, Huntingdonshire, Lincolnshire, Norfolk, Nottinghamshire, the Soke of Peterborough, and Yorkshire.

Growers in these counties who had less than three acres of potatoes this season are still exempt from the sales restrictions.

Labelling of Soft Drinks

The Labelling of Food Order, 1946, has been amended to enable wholesalers and retailers to dispose of existing stocks of soft drinks bearing the approved S.D.I. label, free from the requirements of the Labelling of Food Order. Soft drinks so labelled may be sold by wholesalers until March 1, 1949, and by retailers until June 1, 1949. After these dates wholesalers and retailers must comply with the requirements of the Labelling of Food Order and no further exemption will be granted.

The amending Order does not apply to sales by manufacturers, packers, or labellers of soft drinks.

Token Imports, 1949

The Token Import Scheme in 1949 is to continue on the same basis as 1948. The Token Import annual quota will remain 20 per cent. by value of each individual manufacturer's average trade in 1936-1938 with the United Kingdom in the commodity concerned.

Countries taking part in the scheme will be: Australia, Belgium and Luxembourg, Canada, Denmark, Finland, France, Holland, India, Italy, Norway, Pakistan, Sweden, Switzerland, and U.S.A.

The following items of food and drink are covered by the scheme:

Rolled or flaked oats; cheese rennet; vegetable butter colouring; whisky; *glacé* cherries; bottled fruits, processed for serving with ice cream; canned lobster; pickles; mustard; olives preserved in salt or brine; canned vegetables (other than tomatoes and tomato *purée*); quick frozen peas; canned soups; canned macaroni and spaghetti; canned pork and beans; jelly powder; sugar confectionery of all kinds, not including cocoa preparations; marshmallow (cooking ingredient); quick frozen fruits; onion and garlic salt; pectin (domestic pack).

Empire Sugar Price

Dominion and Colonial sugar producers have been advised that the Ministry of Food has agreed to maintain for 1949 the same price for sugar as for 1948.

Dried Fruits

The Dried Fruits (Control and Maximum Prices) Order, 1948, has been amended so as to permit the manufacture of date paste and to authorise its sale or resale for use in the manufacture of flour, chocolate or sugar confectionery, and for export. The sale of date paste to the public is still prohibited.

The amending Order came into force on January 1, 1949.

Imported Canned Rabbit

The Meat Products and Canned Meat (Control and Maximum Prices) Order, 1948, has been amended so as to increase by 1d. per lb. the maximum first-hand wholesale and retail prices of imported canned rabbit.

This increase, which brings prices of imported canned rabbit into line with those of frozen rabbit, takes account of the increased costs of packers.

The new Order came into force on January 16, 1949.

Removal of Ban on Pig Sales

The Pigs (Sales) Order, 1948, has been amended by the removal of the ban on the sale of pigs weighing more than eight score (160 lb.) live-weight except to the Ministry of Food or for breeding purposes.

The success of the scheme for the registration of pigs owned by self suppliers has made this restrictive control unnecessary.

The new Order came into force on December 23, 1948.

Imported Youngberry Jam

The Preserves Order, 1947, has been amended as from January 9 to prescribe maximum prices for youngberry jam which is now being imported for the first time and is coming from South Africa.

The prices are the same as those at present in force for imported raspberry, peach and pineapple (mixed), and loganberry, and the amending Order merely adds youngberry jam to this group.

Youngberries are a cross between raspberries and loganberries.

White Fish Subsidy Authorised

CHANGES IN PRICE CONTROL

The payment of a subsidy of 10s. per stone on white fish caught by British fishing vessels in the near, middle, and inshore waters, has been authorised by the Minister of Food, after consultation with the Ministry of Agriculture and Fisheries and the Secretary of State for Scotland. Owing to rising costs many of these vessels have been operating at a loss in recent months, and the subsidy is designed to enable them to continue fishing without having to increase the price of fish to the consumer.

The waters to which this payment will apply are those south of 63° N. latitude and east of 17° W longitude. To qualify for subsidy, the whole of the catch landed in any voyage must have been taken within these limits. The fish must be sold by wholesale and, at ports where allocation is in force, must be submitted for allocation. Suppliers of the application forms to be completed by vessel owners or their authorised agents are being sent to the various producers' associations. If any owner is unable to obtain a form he should write to the Finance Director, Ministry of Food, Fish Division, Carlton Hotel, London, S.W. 1.

The Minister of Food has also decided to reduce the maximum first-hand prices of headless fish (except skinned headless dogfish) by 3d. per stone. During the war, when many boats were absent from the fishing grounds on war service, a financial inducement to head fish at sea was given in order to save space in the holds for as much edible fish as possible. The need for this exceptional measure has passed as very few vessels are now returning loaded to capacity. It is hoped that the proposed price adjustment will have the effect of increasing the supply of fish heads for manufacture into animal feedingstuffs. In order not to change the margins earned by coastal merchants on headless fish, the levy on such fish will be increased by 3d. per stone, *i.e.* from 10d. to 1s. 1d.

Cooked white fish (except roes and milts), when cooked otherwise than by smoking, is freed from price control.

Orders amending the Fish (Control and Maximum Prices) Order, 1947, and the Fish Sales (Charges) Order, 1947, have been made by the Minister of Food and the Treasury respectively, and came into force at the ports on December 4, 1948, and elsewhere on December 5, 1948.

Machinery, Plant, and Appliances

With the removal of control over the supply of bakery and biscuit plant and machinery, recently announced by the Minister of Supply, the Ministry of Food will, in future, have no responsibility for deciding the priority in which orders for plant should be executed, and it cannot intervene in the interests of individual firms who must now make their own arrangements with the plant manufacturers.

Where, however, a licence is sought for a building project involving the supply of new plant and machinery, the applicant will, before support can be given to the building licence, be asked by the Ministry of Food to produce written confirmation from the plant manufacturers that the plant or machinery will be available at the estimated dates.

Sweetened Dessert Powder

The import of a very small quantity of sweetened dessert powder from Denmark has now been approved. Importers will be nominated by the Danish exporters and each nominated firm will be advised by the Ministry of Food when the nomination list is received from the Danish authorities.

Catering Trade Working Party

Miss B. C. Hobbs, Ph.D., B.Sc., Dip.Bact., supervisor of the Food Hygiene Unit of the Central Public Health Laboratory, Colindale, has been appointed by the Minister of Food to be an additional member of the Working Party set up to make recommendations for the improvement of hygienic conditions in the catering trade.

Board of Trade Amalgamation

In order to ensure that both trade policy and matters of trade promotion are the responsibility of a single department in the Board of Trade, the Commercial Relations and Treaties Department and the Export Promotion Department of the Board of Trade have been amalgamated into a new Commercial Relations and Exports Department.

The change will involve no alteration in the existing practice under which the Board of Trade maintain direct contact with officers overseas, but it should help such officers in giving them a single point of contact on trade matters at home, which will be the appropriate geographical branch formed by the merger of the country branches hitherto existing in both the original departments. Similarly it will give industry one point of contact less in the Board of Trade. In addition, as far as possible officers of the two departments will be kept on work with which they are familiar, thus securing continuity of service with industry.

The geographical sections are at I.C. House (Tel.: Whitehall 5140) and the Industries Branches and the Reception and Tours Section at Thames House North (Tel.: Victoria 9040). The Exhibitions Branch remains at Horseferry House (Tel.: Victoria 6800). For the present at least these latter Branches and Sections are remaining with the same structure and duties as previously, although they all form part of the new combined Commercial Relations and Exports Department.

The department will in future be organised in three parts, dealing respectively with countries or groups of countries (where the subordinate divisions are known as "country branches"), general matter, and industries. Where general questions of export policy are concerned, of the kind that would usually interest the national trade associations, letters should normally be sent to the Commercial Relations and Exports Department. Where questions of the kind that would usually interest individual trade associations are concerned, the answer will depend primarily upon the type of problem upon which advice is sought or given.

Information and Advice

Diabetic Chocolate

B.2908. *We shall be glad to receive any information available on the production of diabetic chocolate.* (London.)

Diabetic chocolate, of course, must contain no sugar (sucrose), and should be consumed in strict accordance with dietetic instructions.

The following is a formula for its preparation:

Chocolate neatwork	91 lb.
Cornflour	14 lb.
Skimmed milk powder	14 lb.
Soluble saccharin	2 oz.
Vanillin	1 oz.
Cacao butter (added at conching stage)	6 lb.

The cacao beans are roasted at 275° F. and ground in the liquor mill as usual. Ninety-one lb. of this neatwork is placed in a kneader or melangeur with the cornflour and milk powder. After thoroughly mixing, the mass is carefully refined twice and finally placed in the conche with the additional cacao butter, vanillin, and saccharin. The mass is conched for seventy-two hours, tempered, and deposited into moulds.

Before the late war sorbitol, a hexahydric alcohol, was used as the sweetening agent in diabetic chocolate. This substance, originally procured from the Continent, is rather expensive. It possesses one-third the sweetening power of sucrose, and is packed in the form of a viscous syrup. Sorbitol is a much more palatable sweetener than saccharin. It is, however, more or less unobtainable at the present time.

Causes of Mould on Jam

B.3069. *We should like information as to why mould forms on jam and also details of the correct treatment of containers.* (Eire.)

Mould on jam has several causes. The jam should be stored in a dry atmosphere at about 60° F., the lower the temperature the better. But even under such conditions mould may develop through incorrect preparation. Moulds tend to increase as the sugar concentration falls. The percentage of soluble solids should be about 72 per cent. when the acidity is normal. The most practical way to test this is by means of a refractometer.

The jam from the boiling pans does not contain living mould spores, yet each jar filled can become infected from the air. For this reason jam should be covered quickly and the filling and packing-room be kept as clean and free from outside contamination as possible. Freely permeable closures such as parchment are commonly used. Sometimes sterilisation of the jam pack is resorted to, the jars being covered with hermetically sealed tops. The jam may be filled at 190° F. to 200° F., closing immediately, and inverting the jars for three or four minutes, but more thorough sterilisation is carried out in a steam steriliser.

Where it is not practicable to close the jars with metal tops on account of cost or other reasons, parchment tie-over covers are best. They are permeable to air and water vapour. When stored in a dry atmosphere the water vapour from the jam passes out and no condensation occurs. In humid weather water vapour may pass through and be absorbed by the jam, thus reducing the concentration of the soluble extract on the surface layer and so cause moulding. If the humid conditions do not prevail too long this vapour can pass through the cover and no harm will result to the jam. If covers are used which are impermeable to water vapour, condensation on the inside will occur, and mould growth will result.

Mushroom Ketchup

B.3090. *We shall be glad if you will supply us with a recipe for mushroom ketchup.* (Durham.)

The following recipe is suggested as a basis for experiment:

Mushrooms in brine	600 lb.
Soy sauce	5 gal.
Cloves	2 lb.
Pimento	2 lb.
Cardamom	1 lb.
Black peppers	2 lb.
Crushed ginger	2 lb.
Water	75 gal.

Water, mushrooms, and soy sauce are simmered in a pan for thirty minutes. The spices are then added, simmered—not boiled—for a further thirty minutes, then strained through a fine sieve and finally filtered through bags or a filter press until free from sediment. The filtered sauce should be filled into bottles at a temperature of not less than 180°F. The salt content of the finished sauce should be 10 to 12 per cent. A very small amount of meat extract may often be added with advantage.

Information Supplied

B.3057. *Suppliers of conveying machinery.* (Belgium.)

B.3058. *Manufacturers of an electric bench saw for use in a butcher's shop.* (Eire.)

B.3061. *Literature on smoke chambers for meat.* (Lanark.)

B.3062. *Suppliers of raw materials for the manufacture of chewing gum.* (British West Indies.)

B.3065. *Suppliers of machinery for the manufacture of popcorn.* (Warwicks.)

B.3067. *Manufacturers of plant for puffing wheat.* (Sweden.)

B.3068. *Manufacturers of continuous frying equipment for potato crisp production, and suppliers of olive oil and teaseed oil.* (London.)

B.3070. *British suppliers of carob juice.* (Middlesex.)

B.3075. *Suppliers of equipment for filling tomato purée into fish cans.* (Eire.)

B.3077. *Manufacturers of savoy piping cotton duck icing bags.* (Lancs.)

B.3094. *Suppliers of lecithin, tocopherol, and bi-calcium phosphate.* (Leics.)

B.3095. *Manufacturers of canning plant.* (Sussex.)

B.3097. *Suppliers of pudding basins.* (London.)

B.3098. *Makers of machinery and mills for producing cornflour and cornmeal.* (British West Indies.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 2s. each.

607,485. ABERG, R. C.: Sealing devices for bottles, jars, and like containers.

607,590. BAKER PERKINS, LTD., and TUNLEY, A. A.: Transport of goods from a chocolate coating or like machine to a cooler.

607,703. ANCHOR HOCKING GLASS CORPORATION: Machine for sealing bottles, jars, and like containers.

607,810. MOORE, H. E.: Ice cream mix and the production thereof.

608,421. BAKOVENBOUW VOORHEEN H. P. DEN BOER N.V.: Heating element for a baking oven.

608,566. BENNETT, INC.: Can-filling machine.

608,748. REGAN, E., and MCALLISTER, J.: Devices for slicing, chipping, or squeezing vegetables and fruit and for similar purposes.

608,996. RENDLE, T., and SLOSS, K. E.: Preparation of chipped potatoes and the like.

Abstract of a Recent Specification

Treating the Surface of Cheese

When producing certain kinds of cheese it is known to treat the surface of the cheese before the ripening or during the early stages of the ripening with a mineral oil, the so-called cheese oil, for the purpose of preventing the formation of mould on the crust of the cheese and making the crust supple and smooth.

To reduce the use of oil it has been proposed to replace it by an emulsion of cheese oil in an aqueous phase.

It is also well known that cheese may be dipped in or covered with an alcoholic solution of a preservative.

It has been proposed to combine these treatments by suspending the preservative in the cheese oil, but it has been found that the preservative does not exert so strong a disinfecting action as when it is supplied in alcoholic solution.

The present invention relates to a composition of the above-named nature for treating the surface of cheese, such composition consisting of an emulsion of cheese oil in an aqueous phase and not having these drawbacks. The composition is characterised in that the aqueous phase contains a preservative and an organic solvent miscible with water. The preservative can either be water soluble to such an extent that the concentration necessary for the purpose of preservation can be reached or it can be less soluble so as to be present in the aqueous phase in the form of a very finely divided suspension with or without some proportion in solution.

The term "suitable preservative" as used in this specification and claim is used as meaning organic preservatives insoluble or only slightly soluble in water, such as esters or ethers of alkyl phenols or phenolcarboxylic acids. The esters of hydroxybenzoic acids, for example ethyl *p*-hydroxybenzoate, are particularly useful as suitable preservatives.

The present invention accordingly consists of a composition for treating the surface of cheese consisting of an emulsion of cheese oil and an aqueous phase containing a suitable preservative and not less than 10 per cent. of an organic solvent miscible with water.

The *p*H value of the emulsion is most advantageously adjusted to more than 7·0, giving an alkaline reaction which contributes to restrain the growth of mould on the surface of the cheese.

605,625. *Aktieselskabet Grindstedvaerket.*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

JEAN MACGREGOR.—652,528. Canned soups. **Jean MacGregor, Limited,** Block Nos. 62 and 63, Watt Road, Hillington, Glasgow, S.W.2; Manufacturers and Merchants.

PRONULAN. — 655,421. Protein hydrolysates for use in nutritional therapy. **Herts Pharmaceuticals, Limited,** and **Atomised Food Products, Limited,** Bessemer Road, Welwyn Garden City, Herts; Manufacturers and Merchants.

MYNOR.—657,135. Sauces, spices, and condiments. **Mynor (Pty.), Limited** (a joint stock company incorporated in accordance with the laws of the State of New South Wales, Australia), 7, MacPherson Street, Mosman, near Sydney, State of New South Wales, Commonwealth of Australia; Manufacturers.

SHARWOOD'S.—658,019. Farinaceous preparations for food, cereals prepared for food for human consumption, cooking essences (other than essential oils), non-medicated confectionery, coffee, vinegar, baking powder, honey, mustard, sauces, pepper, and spices. **J. A. Sharwood and Co., Limited,** Offley Works, Offley Road, London, S.W.9; Manufacturers and Merchants.

SHIPPAM'S.—658,788. Meat pastes, fish pastes, beef tea, sausages, tongues, brawn, briskets, galantines, whole roast chicken in chicken jelly, chicken livers, chicken breasts in chicken jelly, filleted chicken in chicken jelly, calves' sweetbreads, calves' feet jelly, and soup. **C. Shippam, Limited,** East Walls, Chichester, Sussex; Manufacturers.

PERCO-FILTRO.—659,405. Installations for preparing tea and coffee. **James Stott and Co. (Engineers), Limited,** Vernon Works, Lee Street, Oldham, Lancs; Engineers.

AMPLEX.—659,422. Preparations in the nature of baking powder for replacing a proportion of the normal egg content of bakery products and confectionery. **Lawrence and Hilton, Limited,** 481, Waterloo Road, Blackpool, Lancs; Manufacturers.

New Companies

Time Engineers, Limited. (460070.) 27, Castle Drive, Ilford, Essex. To carry on business of refrigeration and cold storage engineers, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: F. A. James, 27, Castle Drive, Ilford; H. H. Stafford, 28, Grove Park Road, Rainham, Essex; J. A. Kirk, W. E. Ramsden, and W. J. H. James.

Cassanna, Limited. (460198.) To carry on business of bakers, caterers, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: F. J. Follett, The Cottage, Disholt, nr. Bridgwater; H. R. Follett, Cassanna Bakery, Milverton, Somerset.

D. E. Pryce, Limited. (460246.) 24, Frodsham Street, Chester. To take over business of a butcher and manufacturer and retailer of cooked meats, etc., carried on at Chester by D. E. Pryce. Nom. cap.: £10,000 in £1 shares. Dirs.: A. T. Davies (permt.), Leonie C. Davies, and A. S. Davies, all of 63, Foregate Street, Chester.

Howe and Gunson, Limited. (460443.) Dover Road, Blackpool. To take over business of disinfectant manufacturers and bottlers, and bottlers and packers of foods and drinks carried on at Dover Road, Blackpool, by Arthur C. Howe, Eric Chadwick, and Arthur Doherty. Nom. cap.: £1,000 in £1 shares. Dirs.: A. C. Howe, 37, Colwyn Avenue, Blackpool; E. Chadwick, 94, Broadway, Blackpool; A. Doherty, 7, Kingsway, Blackpool.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.